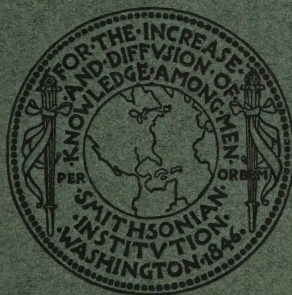


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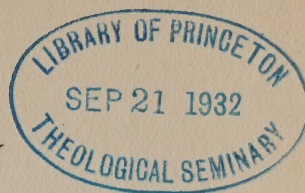
THE VILLAGE OF THE GREAT KIVAS
ON THE ZUÑI RESERVATION
NEW MEXICO

By FRANK H. H. ROBERTS, Jr.



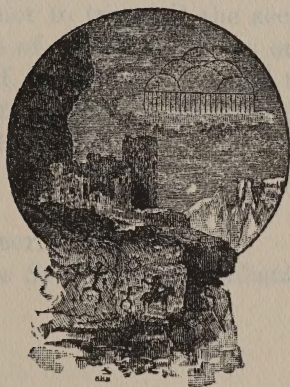
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BY
FRANK H. H. ROBERTS, Jr.



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LETTER OF TRANSMITTAL

SMITHSONIAN INSTITUTION,
BUREAU OF AMERICAN ETHNOLOGY,
Washington, D. C., September 15, 1931.

SIR: I have the honor to transmit the accompanying manuscript, entitled "The Village of the Great Kivas on the Zuñi Reservation, N. Mex.," by Frank H. H. Roberts, jr., and to recommend its publication as a bulletin of the Bureau of American Ethnology.

Very respectfully yours,

M. W. STIRLING,
Chief.

Dr. CHARLES G. ABBOT,
Secretary of the Smithsonian Institution.

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THE VILLAGE OF THE GREAT KIVAS ON THE ZUÑI RESERVATION, NEW MEXICO

By FRANK H. H. ROBERTS, Jr.

FOREWORD

The data which furnish the basis for the following report were obtained from archeological investigations conducted on the Zuñi Reservation in western New Mexico during the summer months of 1930. At the beginning of the field season the plans of the expedition called for a reconnaissance of the region and the excavation of a series of pit dwellings located on a mesa top a few miles east of the present Zuñi village of Ojo Caliente. The survey was conducted in the latter part of May, and it was found that the Ojo Caliente site was not of sufficient importance to warrant intensive investigations. Indications were that better results could be expected from a group of small pueblo ruins in Nutria Canyon, 16.7 miles (26.875 k.) northeast from the pueblo of Zuñi.

The permit issued by the Department of the Interior on April 18, 1930, under which the reconnaissance was carried on, provided for excavations at the site near Ojo Caliente. Consequently it was necessary to request a change which would sanction work at the Nutria Canyon location. This was granted on June 4, and the removal of débris from the house remains was immediately started. Activities were brought to a close the middle of September.

In contrast to numerous other house and village remains scattered over the reservation there is no Zuñi name for these ruins, although the tributary canyon at whose mouth they are located is called Red Paint Place (Helipon'ahonnah kwi), and the canyon just beyond is known as Lonesome Place (Yu'ashah kwi).

Zuñi Indians were employed as laborers, and they contributed in no small measure to the success of the undertaking. They had a marked enthusiasm for the investigations because of a curiosity about the "old people" and a desire to know how they lived, what kind of pottery they made, and what sort of implements they used. The boys were unusually careful in their work and in many instances made pertinent suggestions which were of help in the interpretation

of finds. Linda B. Roberts kept the field catalogue, supervised the cleaning of specimens, restored broken pottery, and assisted in the preparation of drawings. Supt. G. A. Trotter of the Zuñi Reservation had a manifest and appreciative interest in the excavations and extended many courtesies to the expedition.

INTRODUCTION

Within the confines of the present-day political domains of Colorado, New Mexico, Arizona, Utah, Nevada, western Texas, and northern Mexico are found innumerable traces of former human occupancy. In many cases the record is dim indeed and all but obliterated. On the other hand, there are remains which even the most casual observer can not fail to note. From the first penetration of the region by white men in the era of Spanish exploration to the present day there has been an ever-increasing interest in these vestiges of earlier peoples and a desire to know their history. During the last 50 years the efforts of many men have been devoted to the diverse phases of the problem, and out of their patient gathering of evidence has developed a fascinating and vivid narrative of the growth of southwestern cultures.

As would be expected, the obvious features were those first to attract the investigator. Consequently the great cliff houses and ruins of structures, built in the open, on mesa tops and valley floors occupied the excavators for many years. It is only recently that the lesser and inconspicuous remains have received their due share of attention and have contributed the information essential to a knowledge of what actually transpired in the region. There are still phases to be more thoroughly studied and better understood before the story can be considered complete, even though the broad outline is now well defined. The recognition of the various stages in the cultural sequence is so recent and new information is being obtained so rapidly that a review of the present status is deemed advisable if there is to be a proper understanding of the relation which the ruins described in the major portion of this report bear to others in the area.

Scattered throughout the Southwest, probably antedating the beginning of the Christian era by many centuries, was a nomadic people dependent to a large extent upon the hunt and a chance gathering of wild seeds, fruits, and plant roots for their livelihood. At the present time evidence of such a group is meager indeed, but there have been sufficient indications to warrant the postulation of its having existed. A number of finds which can be attributed to human occupancy of portions of the area at a comparatively remote date have been made within the last few years. Thus far, however, none of the

latter can be definitely connected with the group mentioned above. The discoveries referred to are those which were made at Folsom and Bishops Cap, N. Mex., and in the Gypsum Cave, Nev. They have attracted considerable interest and have been responsible for some misconception with regard to their significance from the standpoint of later cultural remains. In view of this it is well that they be mentioned in passing. Furthermore, a brief summary of them will also show what some of the present-day investigations are revealing and indicate what may be expected as further progress is made in the researches being conducted by various institutions.

At Folsom, N. Mex., during the course of several seasons' field work, a number of very well chipped projectile points were found in unquestionable association with the remains of an extinct species of bison. The animals had apparently been killed around a water hole and after as much of the flesh as could be carried away had been removed the carcasses were left to sink into the mire. This is evidenced by the fact that the tail bones were missing from many of the skeletons, showing that the skins had been removed and probably carried away by the hunters for use in moccasins, coarse clothing, robes, and as tent covers. Through the course of time natural agencies drained the swampy ground and covered the site with several feet of earth washed down from the higher levels in the vicinity. Still later a small gully was cut through the deposit and the resultant exposure of bones led to the discovery of the deposit.¹ Stone points similar to those from Folsom have been found at other localities in the same general region. In material and type the whole group is more suggestive of later peoples in the districts south and east than of those in the Southwest.

The Bishop's Cap discovery was that of a possible association between human remains; in this case the actual bones of man and not objects of his handiwork, and those of the cave bear, camel, extinct horse, and ground sloth.² There has been some question concerning the reliance which can be placed on the assemblage of bones here uncovered. Opinions differ, many believing that the record has been clouded by a disturbance and a redistribution of the deposit. This occurrence of human and extinct-animal bones takes on an added significance, however, in the light of a somewhat comparable association which has since been found in the Gypsum Cave deposits in southeastern Nevada.

Work at Gypsum Cave has revealed some very striking evidence for the contemporaneity of men and the ground sloth in that portion of the Southwest. In addition, bones from extinct species of the

¹ Cook, H. J., 1927, 1928; Figgins, J. D., 1927.

² Bryan, W. A., 1929; Thone, Frank, 1929.

horse and camel were found in this cave, but they came from lower levels and no doubt antedate the remains of the ground sloth and the man-made objects.³ The artifacts consist of worked sticks, a stone knife blade, and a stone-tipped foreshaft from a spear. The latter was probably a short, javelinlike implement hurled by means of a spear thrower. Above the sloth layer were stratified deposits in which there were objects from later, well-defined stages in southwestern cultures. There is in this the nearest approximation to a link between the reputedly older finds and the earliest unmistakable inhabitants of the region. Nevertheless, the evidence is not sufficient to warrant the belief that in this instance there is a record of the basic group which developed into the sedentary population which produced the cultures and left the ruins upon which the interest of archeologists has been centered. Investigations are being continued in Gypsum Cave and may eventually produce the data necessary to the solution of this problem.

The nomadic occupants of the region, those who are considered the progenitors of the later peoples, after a time obtained corn, together with the knowledge of how to plant and cultivate it. How this product reached them or whence it came is not known. The present hypothesis is that it was introduced from the Mexican area to the south. It was of the greatest importance to them, however, and provided the foundation upon which the entire structure of ensuing cultural development rested. The introduction of agriculture, the adoption of the corn-growing industry, because of its inherent nature, imposed upon the people a more sedentary existence. At first it probably did not have a marked effect on their mode of life, but as time went on and better methods of cultivation brought larger harvests it became necessary to provide storage places for the grain.

The first definite and comprehensive knowledge of them comes at this period in their development. In the lower levels of dry caves is evidence that they were relinquishing their former nomadic, hunting form of life and were becoming more sedentary in their habits. The caves show that they were used as temporary shelters and also for storage purposes. Dug into the floors are circular or oval pits, in many cases lined with slabs of stone, which constituted the lower portions of granaries in which the surplus grain was placed. One is occasionally found in such a good state of preservation that the pole, brush, and plaster superstructure is still in position. In several instances these bins were found filled with corn, the kernels of which were as bright and shiny as though only recently harvested instead of having been buried for many hundreds of years.

³ Harrington, M. R., 1930, *a*, *b*; Stock, Chester, 1931.

The storage bins were often put to a secondary use and served as sepulchers for the dead. It is from these graves that a knowledge of the physical characteristics of the people and of their arts and industries has been derived. As has been the custom among many peoples of lower cultures, material objects used in life were interred with the deceased. Climatic conditions in the Southwest, because of the extreme aridity, are unusually favorable to the preservation of articles which otherwise would rapidly decay and fall into dust. As a result, the materials from the portions of caves where no moisture has penetrated enable the student to draw a fairly complete picture of the times. The people were skilled makers of coiled baskets, twined woven bags, ropes, head bands, sandals, fur-cloth robes, short, apronlike cord skirts for the women, game snares, and large nets for catching small animals. It is supposed, from objects recovered in the caves, that the men wore a small loin covering of the "gee-string" variety, but thus far none of the male bodies have been found with such a garment in place. Their weapons were a short javelin, hurled by means of a spear thrower or atlatl; short curved clubs of wood; stone knives; and clubs fashioned from elk antlers. The implements of their more peaceful pursuits were wooden planting sticks, curved sticks for use in dressing skins, wooden scooplike objects for digging, and bone tools for service in weaving.

The dwellings at this stage in the development of the people must have been of a highly perishable nature, because thus far no traces of them have been found. It is possible, of course, that they did not have a definite house and placed chief reliance on caves and other natural shelter for protection against the vagaries of the weather. They did not occupy the caves for any considerable periods, however, as there are not the accumulations of refuse which would have resulted had the presence of such a group been permanent. Hence it would seem that they must have had some sort of a domicile; one so flimsy in form, however, that remains have not been preserved. The only efforts at substantial construction over a considerable length of time were those devoted to the development of the granaries described in a preceding paragraph.⁴

Studies of the remains of the people have shown that they were short of stature and slender in build. Their faces lacked the massive size and prominent cheek bones of the later Indians. Their noses were medium to broad, and their heads were long and undeformed. Their skin was probably brown and their hair dark, but

⁴ For detailed information on the various phases of this cultural stage consult: Guernsey, S. J., 1931; Guernsey S. J., and Kidder, A. V., 1921; Kidder, A. V., and Guernsey, S. J., 1919; Kidder, A. V., 1924; Morris, E. H., 1921 b, 1927; Nusbaum, J. L., 1922; Pepper, G. H., 1902; Prudden, T. M., 1897.

more inclined to be wavy or curly than in the case of present-day American Indian types. The group was not wholly uniform. It seems to have been a blend of at least three basic strains, and three types of individuals would probably have been observed by a visitor to the region. The most numerous seem to have been those with a comparative smoothness and symmetry of head form, rather narrow faces which tended to be a little long, weakly developed jaws and chins, and medium to narrow noses with elevated bridge. Others were somewhat more robust and rugged and although long headed had receding foreheads and prominent brow ridges, shorter and broader faces with more noticeable cheek bones, and medium to broad noses with a submedium bridge. The third type had long but smaller heads, somewhat swollen foreheads, inconspicuous brow ridges, very broad noses with flat bridges, moderately developed cheek bones, and weak chins. The people in general were predominantly non-Mongoloid in character. The first of these groups is closely allied to the fundamental brown-skinned European-African long-headed stock called "Mediterranean"; the second seems to have been derived from an archaic type of modern man which is represented, mixed with other elements, in the native Australians and the Ainu; the third was almost certainly negroid, but not negro. It is not thought that separate groups of each migrated to and mixed in the Southwest, but that the people who spread into the New World from northeastern Asia were already racially mixed and that their descendants in the Southwest exhibit the types discussed because of the segregation of features in occasional individuals.⁵

The same caves in which the evidence for the early stage in the history of these southwestern peoples was found also contain manifestations of their progress. In the upper levels, those of more recent date, are the remains of crude houses which indicate that they were adopting a definitely sedentary existence. Furthermore, they were organizing into regular communities. The vestiges of their villages are not only found in caves but in the open as well, on the canyon floors and mesa tops. There is some question concerning the origin of their houses. The work of certain investigators has tended to show that they were the result of constant improvements in the methods of granary construction, through which it was discovered that by enlarging the pits and heightening the brush superstructure a fairly good dwelling of the pit variety could be built.⁶ On the other hand, the fully developed structures strongly suggest a relationship to the basic earth-lodge type widely distributed in both the New World and northeastern Asia. Consequently it may

⁵ Hooton, E. A., 1930, pp. 355-362.

⁶ Kidder, A. V., 1924, p. 121.

well be that the house form should be attributed to a diffusion from the Old World rather than to local developments. It is, of course, possible that there was a combination of both factors. The problem is one, however, which needs further evidence before it can properly be solved.

These first houses were crude yet must have been comparatively comfortable. They consisted of a circular, oval, or rectangular excavation roofed with a truncated superstructure of poles, brush, and plaster. The earth walls of the excavation were covered with mud plaster. Oftentimes it was necessary to reenforce the sides of the excavation by lining them with stone slabs or a wainscoting of poles. When this was done the plaster was applied over them. A hole in the center of the flat portion of the roof permitted the escape of smoke from the fire, which was built in an open pit in the center of the room. Entrance to the structure was gained through an antechamber and passageway, usually placed at the southeast side of the house. Close to the dwelling, in most cases, were storage bins of the type already described. A number of these domiciles, together with their granaries, were grouped in an irregular cluster to form a village.⁷

At about the time when the first houses were being built a new industry made its appearance. The manufacture of pottery was added to the other occupations of the people. This has generally been considered another introduction from the south. At the very most, however, it was only the idea which reached the area, because the entire ceramic development was unquestionably local in its character.⁸ Many are inclined to believe that even the idea was an independent discovery, because thus far no one has found pottery in the Mexican area which could in any way be considered the progenitor of the southwestern forms. The first crude clay containers were fashioned in basket molds and could not be considered true pottery because they were not fired but simply dried.⁹ Ultimately it was learned, accidentally, no doubt, that the secret of making useful and durable clay vessels lay in firing them, and from that time on ceramics assumed a major rôle in the Southwest. Baskets became less and less important, and although they continued to be made their quality was somewhat inferior and their numbers decidedly smaller.

Subsequent to the development of the permanent house and the appearance of pottery making, other features were added to the material culture of the people. Several varieties of corn were grown where previously there had been but one hard, flintlike form. Beans

⁷ Roberts, F. H. H., jr., 1929 b.

⁸ Morris, E. H., 1927, pp. 138-152, 198.

⁹ Guernsey, S. J., and Kidder, A. V., 1921, p. 98; Morris, E. H., 1927, pp. 138-160; Nusbaum, J. L., 1922, pp. 138-144.

supplemented the list of agricultural produce. Feather robes began to replace those of fur. The bow and arrow came into use. The latter was probably directly associated with another factor, one which was to have a tremendous bearing on the future of the culture, namely, a new group of people was drifting down from the north along the cordillera and finding its way into the region. They most likely were the bearers of this new kind of weapon, although the latter unquestionably preceded them as a diffused cultural trait.

The appearance of this new group was not in the form of an invasion but rather a gradual penetration by successive small bands. There is no definite evidence at the present time to show the corridors through which these immigrants entered the area. Later developments, however, suggest that there were possibly two main lines of access. One led through the Wyoming Basin into northeastern Utah, whence some groups moved south into northeastern Arizona and others west into the isolated periphery north of the Rio Colorado. The latter probably were the tag-end of the movement and throughout their subsequent development continued to be laggards. The second avenue extended from the east along, or just below, the present Colorado-New Mexico boundary line to the upper or northeastern San Juan Basin. There probably were clashes of greater or less degree between the "aliens" and the folk already occupying the region, but the general tendency seems to have been toward a mixing of the old and new. Evidence for the arrival of a new element in the population is clearly demonstrated by the physical remains of the people. For this stage they include, in addition to the various types of long heads, distinctly Mongoloid broad heads. In older sites the latter are in the minority. Levels of more recent date, however, show greater numbers, and eventually they became the predominant group.

The stage immediately following the advent of this alien group was a period of transition and instability. The newcomers seemingly brought little with them beyond the bow and arrow, possibly the grooved ax, and a distinct capacity for cultural development. They took over, changed, and adapted to their own needs the material culture of the older inhabitants. The mixing of the two peoples apparently produced the vigor which ultimately carried them to the high development which sedentary life reached in the Southwest. This was not accomplished in a day, however, and for a considerable period the older inhabitants and culture held on, notably in the eastern, southern, and western borderlands. Throughout the north-central part of the area the coalescence and attendant growth seem to have progressed at a comparatively rapid and steady rate. There were two general phases, nevertheless, one centering in the northeastern Arizona district and the other in western New Mexico and south-

ern Colorado. It is this factor which has suggested the possibility of the new peoples penetrating the area along two different lines of migration.

Out of the stress and turmoil several new features appeared. Cotton was introduced and fabrics made from it assumed an important place in the material culture. The turkey was domesticated. Previous to this the dog had been the only tamed creature. The grooved ax became one of the important implements. There was a distinct improvement in pottery making, together with an unfolding of stylistic fashions in the character of ceramic decoration. There was a change in cradling practices, because the skulls from this horizon, and continuing through subsequent stages, exhibit a pronounced deformation of the lower back portion, the occiput. In the nuclear part of the area, the north-central section which is traversed by the San Juan River, the crude single-room semisubterranean domiciles gave way to structures which had only slightly depressed floors instead of pits. The major portion of the house was entirely above ground and had several contiguous rooms. At first the pole and plaster form of construction prevailed, but in time this was replaced by dwellings built of horizontally laid stones.¹⁰ In the peripheral precincts to the south and west the pit dwellings continued in use, although the form was modified. The pits were dug deeper and entrance to the chambers was by means of a ladder through the smoke hole in the roof instead of an entryway at one side. The latter was retained, however, in a reduced and altered form and functioned as a ventilator.¹¹ The pole and plaster type of house was late in its development in those regions, as compared to the northern nucleus, and continued into later stages.

The creation of structures with several contiguous rectangular rooms brought the people face to face with a problem somewhat different from the material ones which they had been surmounting. The religious rites and ceremonies which were so integral a part of their lives were inseparably associated with the round, semisubterranean form of house. The point at issue was how to proceed. Should the ceremonies be changed or some special provision be made for them? Primitive man clings tenaciously to established customs and so drastic a move as changing the rituals was out of the question. Consequently, each house group erected one of the old-style chambers, apart from the new-type dwellings, and the rites were continued in orthodox fashion. As the culture progressed the ceremonial chambers became more and more specialized and ultimately developed into what investigators to-day call kivas.

¹⁰ Kidder, A. V., 1924, pp. 124-125; 1927 *a*, p. 490; Morris, E. H., 1919 *b*, pp. 187, 190-191; Roberts, F. H. H., jr., 1930, pp. 19-73.

¹¹ Roberts, F. H. H., jr., 1931, pp. 16-86.

Following the establishment of the new house type and considerable improvements in it, the people lived for a protracted period of time in small communities scattered throughout the region. In the northern part of the area, the culture nucleus, the dwellings were mainly of the form called single clan or unit structures.¹² These houses were of stone, built entirely above ground, containing a number of rooms, usually between 6 and 14. They were a single story in height. The rooms were erected in one long row, a double tier, an L-shape or in the form of a rectangular U. Generally at the south or southeast side, and some distance from the building, was the subterranean ceremonial chamber or kiva. This type of dwelling did not reach as high a degree of excellence in the peripheral parts of the area. In the south and west pole-and-mud houses and irregular agglomerations of rooms whose walls were formed from large quantities of adobe mud and unworked bowlders constituted the living quarters. Furthermore, the ceremonial chamber did not attain the marked specialization there which it did in the north. As a matter of fact the circular form was entirely missing in some sections. Where this was the case certain of the rectangular rooms seem to have functioned in a ritualistic capacity. In this respect the provincial communities displayed a disregard for the ceremonial conservatism of the northern nucleus.

During this stage attention was turned to other cultural matters, in addition to the improvement of dwellings, and there was a distinct advancement in the ceramic industry. Pottery forms took on new characteristics and there were changes in the style of decorations applied to the vessels. These features are so typical that they furnish good criteria for determining the horizon.

Eventually the people in the northern sections began to abandon the small-house villages and to concentrate into large, more or less isolated centers. This was accompanied by the erection of great terraced buildings with many rooms, the result of joining a number of unit houses together to make a single communal dwelling and augmenting it by constructing upper tiers which formed second and third, even in some cases fourth, stories. In addition, it became the general practice to incorporate the ceremonial chambers in the main block of the building. Although there is no definite proof on the subject, beyond the finding of an occasional unit structure which had been ravaged and its occupants slaughtered, present indications are that a constantly augmented pressure from the wilder, more nomadic Indians of the borderlands forced the sedentary peoples, in self-defense, to gather in populous centers. There is nothing thus far to show who these enemies were. The most plausible

¹² Fewkes, J. W., 1923 *α*; Prudden, T. M., 1903, 1914, 1918; Martin, P. S., 1929, 1930.

hypothesis seems to be that raids by the Shoshonean groups north and northwest of the San Juan furnished the initial impetus to a concentration in large communities. Somewhat later, though not long delayed, there was a penetration from the east by other nomads who stimulated the convergent movement already under way. These newcomers may well have been of the Athapascan stock, probably accompanied by peoples from the pillaged villages of the eastern periphery, which moved west into the four corners region, where Arizona, Colorado, Utah, and New Mexico meet, and mixed with groups from the west and southwest to form the heterogeneous Navajos. The southern sections escaped the menace of marauding tribes until later. When the latter did invade the settlements there they apparently swept in from the east, striking in the Upper Gila region and pushing the sedentary occupants west and northwest.

During the earlier stages of development in the region the cultural features had a generalized aspect. Immediately following the infiltration of the broad-headed group there were two phases, as previously mentioned, an eastern and a western. With the concentration into more or less isolated communities the tendency toward specialization became increasingly pronounced. This trend finally reached its climax in the crystallization of definite and characteristic forms peculiar to each center and the provinces under its domination. Because of this fact it is possible to identify pottery types with certain restricted districts; to associate different styles of masonry with particular subareas; and to correlate the several kinds of ceremonial structures, the kivas, with specific centers. It is to this period of life in great urban communities with their accompanying specialization that the term "Classic Era," so frequently heard in discussions of southwestern archeology, refers.

The large northern outposts for a time stemmed the tide of encroaching and plundering nomads, but they, too, eventually broke down and were abandoned. There no doubt were other factors which contributed to their ultimate collapse. The outside enemies were probably aided by factional strife within the villages and by discord between the various centers. There likely was little cooperation between communities, and concerted defensive measures probably were lacking. At the time of the Spanish conquest the general tendency was to allow each village to attend to its own welfare. If it stood or fell concerned only itself. Hence it is logical to suppose that a similar condition prevailed in earlier stages. Furthermore, severe droughts occur periodically throughout the Southwest, and it may well be that a series of prolonged crop failures reduced the resistance of the people to such an extent that they gave up the struggle and set out to find new locations where life would be less rigorous and more peaceful. The abandonment of the north-

ern frontier has frequently been explained entirely on the basis of a progressive and intensive desiccation of the region. Indications are, however, that there has been no catastrophic climatic change in that portion of the area since the days when the sedentary inhabitants attained their fullest development. Also, many districts at the present time would support a fairly large Indian population. In view of these conditions such natural phenomena should be considered only in the light of a contributing factor.

Irrespective of what the actual causes may have been, it is definitely known that there was a marked decline from the former high level and an era of instability and migration set in. The region which had been the nucleus for and the leader in the development of the culture, the San Juan, and whose great centers had been the guardians of the northern frontier was deserted. Shortly afterwards the villages in the Upper Gila district were abandoned, and still later there were withdrawals from the Chihuahua Basin and Lower Gila settlements. There was an even greater concentration of peoples in the more centrally located sections and a definite reduction in the boundaries of the occupied area as a whole.

The actual movement of peoples and the routes which they followed when they abandoned the northern borderlands have not been thoroughly worked out. There are certain indications, however, which suggest the general trend of events. The movement was not one concerted and simultaneous exodus. It consisted of a series of small but ever-increasing migrations. The first communities to be abandoned seem to have been those in the northeastern San Juan basin, the Piedra region. The withdrawal there followed two main avenues. Peoples from the Piedra proper probably drifted south and southwest along the river, joining with other groups to make the settlements whose ruins are to be seen in the vicinity of Aztec, N. Mex., and to swell the population in the Chaco Canyon.¹³ The inhabitants of the large houses in the tributary canyons farther east along the San Juan seem to have spread south and east to the headwaters of the Chama River and thence into the northern Rio Grande region. The latter movement must have been retarded sufficiently to permit evacuation of the district by the westward-pushing nomads, since no group is likely to move deliberately into a zone of marked disturbance.

Farther west, in southwestern Colorado, in the Johnson Canyon region, the settlers probably followed two methods of escape. Certain groups no doubt took advantage of the refuge spots along the Mancos River and in its tributary canyons leading back into the Mesa Verde; perhaps even worked their way onto the mesa and joined forces with the peoples there. Others unquestionably moved

¹³ Roberts, F. H. H., jr., 1930, pp. 17-18.

south, going to the communities in the Aztec cluster or to the great Chaco Canyon centers.

West of the Mesa Verde in the Montezuma Valley-McElmo Canyon district were two large village groups whose existence apparently was terminated at about this same time. Refugees from these centers scattered in several directions. Some worked west into southeastern Utah, where they left considerable traces of their occupancy of the canyons and mesa tops. Other groups migrated south and southeast. A backwash from this movement possibly carried some of them up the Mancos River and the side canyons to the Mesa Verde. Additional parties made their way to the Aztec district, while others continued down into the Chaco Canyon. There are distinct evidences of a considerable increase in population at all three of those localities at approximately the same time, and there seems little question but that the movements just outlined were responsible. The new alignments delayed the inevitable, but one after another the centers went under. The first to fall was the Chaco Canyon group, then the Aztec towns were deserted and, finally, the Mesa Verde. The people scattered east, south, and west. A large group from the Mesa Verde tarried for a time at Aztec, where the houses had already been deserted by their builders, but eventually was forced from that refuge.

The Kayenta region in northeastern Arizona seems to have escaped oppression for a considerable interval because the people in that section were still living in widely scattered small houses during the last stages of the Chaco Canyon and other eastern centers. The blow finally fell, however, and they were driven into large communities and forced to make strongholds of their dwellings. The abandonment of the Chaco was no doubt well under way before the fortress-like cliff structures were erected there. The exodus from the Kayenta district was to the south, and the migrating groups probably went into the mixture which produced the later Little Colorado settlements.

Recent studies have indicated several different trends in the south. As previously mentioned, the Upper Gila peoples of central western New Mexico went north and west. The groups in the Mimbres Valley region seem to have been pushed slightly west and definitely south. They probably joined with some of the north Mexican villagers and contributed to the development of the Casas Grandes center. There apparently was a juncture in the Tonto Basin-Roosevelt Lake district of Arizona between the westward moving Upper Gila bands and itinerant parties drifting south from the Little Colorado region. From the locale of fusion the combined elements overflowed into the area south of the Gila, the Gila Basin, where they coalesced with a distinctly different group. Up until this time

the Gila Basin had had a separate growth, possibly affected by north Mexican peoples and had been but little influenced by the highly developed northern and eastern cultures.¹⁴ Later there was a backwash to the east from this center, and features peculiar to it are found well into southwestern New Mexico.

The inhabitants of the western peripheries probably moved east and southeast to add their numbers to the communities in the Little Colorado and adjacent districts. That portion of the southwestern archeological area has not been as thoroughly studied as other sections, and indications of movements are not as clear-cut as for the regions just discussed. Future investigations will no doubt throw considerable light on the problem.

The redistribution of the sedentary peoples had become fairly fixed, a whole new series of communities had been started along the Rio Grande and Little Colorado Rivers, and the culture seemed headed toward a renaissance when the arrival of the white men struck the final blow. Since then there has been a gradual replacement of the native arts, industries, customs, and beliefs by those of the white man.

SYSTEM OF NOMENCLATURE FOR CULTURAL STAGES

The unfolding and development of the sedentary cultures outlined in preceding pages did not follow a smooth, unbroken curve from beginning to end but progressed by stages. In each of these there was an appreciable period when conditions were static. It is the material from these intervals of quiescence which furnishes the picture of normal conditions in each stage. Between norms the boundary lines are vague; there is an overlap of features that sometimes confuses but which need not cause concern if all phases are carefully observed and interpreted. To facilitate study and to simplify discussion, workers in southwestern archeology have adopted a system of nomenclature by which the chronologically sequent periods may be designated. By this it is not implied that there were many different peoples, that one period stopped abruptly to be followed by another totally different in character, or that the inhabitants themselves necessarily made such distinctions. The names given to the various stages merely furnish a convenient method of denoting them. The same thing is done to-day with respect to cultural development in the United States. Such terms as "colonial period," the "era of westward expansion," and the "gay nineties" are frequently heard. Each indicates a combination of factors which sets it apart from other phases and which establishes its proper place in the historical pattern.

¹⁴ Hawley, Florence M., 1930. The Medallion Series, 1929, Undated, a, b.

The several horizons in the development of southwestern peoples and the sedentary culture of the region have been classified under two main headings called the Basket Maker and the Pueblo. There are a number of subdivisions in each; the first has three and the second five. They are designated simply by using the main title and a number. Both names have been employed by southwestern archeologists for a long period of years and for that reason were retained when the present system of nomenclature was adopted at a meeting of field workers and students in 1927.¹⁵ The term "Pueblo" is the oldest, since it has come down from the Spaniards, who used it to designate the compact permanent settlements of these people as distinguished from villages of scattered houses of less substantial construction. The "Basket-Maker" designation was first applied to that particular cultural phase by Richard Wetherill, following discoveries made by him and his brothers in southeastern Utah in the early nineties. Pepper and Prudden adopted it in describing the Wetherill finds, and subsequent investigators have continued the practice.¹⁶

The Basket-Maker phase is the oldest from the actual chronological point of view. It has three main stages. Basket Maker I indicates the period characterized by a nomadic group sparsely scattered over the area. Basket Maker II is applied to the stage where the people were semihunting, semiagricultural in their pursuits; when they stored their crops in stone-lined pits located in the floors of caves; when they began experimenting with crude, unfired containers of clay. This is also referred to as the classic era of the Basket Makers because of the fact that it was during this horizon that the making of baskets and woven materials reached its peak. Basket Maker III is the name given to the stage when permanent houses of the pit variety were erected and gathered together into small villages, when fired pottery became an integral part of the culture, when feather robes began to replace those of fur, when there was greater diversity in the raising of food products; and when the bow and arrow began to be adopted. It was at the very end of this stage when the new peoples began drifting into the area.

Basket Maker I is supposed to have been distributed over the entire area. Basket Maker II, the classic Basket Maker, gained its fullest development in the Four Corners area.¹⁷ An analogous culture centered around the Coahuila caves region in northern Mexico. Just what the relationship, if any, between them may have been is not

¹⁵ Kidder, A. V., 1927 *a*.

¹⁶ Guernsey, S. J., and Kidder, A. V., 1921; Kidder, A. V., and Guernsey, S. J., 1919, pp. 204-212; Pepper, G. H., 1902; Prudden, T. M., 1897.

¹⁷ Guernsey, S. J., 1931; Guernsey, S. J., and Kidder, A. V., 1921; Kidder, A. V., 1924, pp. 77-79, 119-121; Morris, E. H., 1921 *b*, p. 19; 1927, p. 132; Nusbaum, J. L., 1922.

known. Specimens from the two areas indicate the same general cultural level and the physical characteristics of the people were quite similar.¹⁸ No evidence is available, however, on their possible chronological positions. Basket Maker III remains are found in south central and southeastern Utah, northeastern, and central Arizona, southeastern Nevada, southern Colorado, and north and central western New Mexico.¹⁹ In southern New Mexico, southeastern Arizona, and western Texas cave deposits have yielded materials which indicate a close connection with the north Mexican form of Basket-Maker culture.²⁰ Recent information suggests that these remains were contemporaneous with the Basket Maker III stage in the north. This is evidenced by the presence, in two separate collections from northern sites, of typical southern sandals in association with characteristic examples of the Basket Maker III type. The southern phase seems to have had a form of pottery in its cultural complex and for this reason would apparently bear the same relation to the Coahuila remains that Basket Maker III does to Basket Maker II, namely, represents a developed phase. There is nothing thus far, however, to show that the southern Basket Maker III reached as high a development as that observed in the northern nucleus.

The stage which witnessed the arrival of the broad-headed Mongoloid groups in the Southwest, with the attendant disturbances and transitions, is designated Pueblo I by the archeologists. Remains dating from this period are widely distributed over the area, although, as previously mentioned, there are two distinct phases. The eastern extends from the northeastern San Juan Basin in southern Colorado to the Upper Gila region in southern New Mexico, from the Rio Grande to approximately the present-day New Mexico-Arizona boundary. In the west its southern fringes penetrated somewhat into eastern Arizona. The main cultural center for the eastern Pueblo I phase seems to have been in the Chaco Canyon in northwestern New Mexico. The western Pueblo I ranged from northeastern Arizona south to the Little Colorado River, in the eastern part of the State, swung a bit south of that stream farther west, and continued across to southeastern Nevada. The major portion of its development, however, took place in the region bounded by the San Juan, the Colorado, and the Little Colorado Rivers, with the cultural center in the Kayenta district. The eastern borders are not sharply defined, and there is a strip extending down the Arizona-New Mexico boundary line where the eastern and western

¹⁸ Hooton, E. A., 1930, pp. 236-238.

¹⁹ Kidder, A. V., 1924, pp. 76-77, 121-122; Morris, E. H., 1927, pp. 168-198; Roberts, F. H. H. jr., 1929 b. In the older reports the term "Basket Maker" applies to what is here called Basket Maker II; "Post-Basket Maker" is synonymous with the present Basket Maker III.

²⁰ Roberts, F. H. H., jr., 1929 a; Howard, E. B., 1930.

phases overlapped. That the two forms were contemporaneous has been shown by the finding of objects peculiar to the western phase in the eastern sites, and vice versa. The western Pueblo I was the first recognized and for a long time was thought to be the characteristic form. Later investigations in the Chaco Canyon and northeastern San Juan Basin established the second, and what appears to be the most widespread, division.

The Pueblo I period, because of its differences, the transitions in pottery, house types, and such factors, for a time proved quite confusing. It was first referred to as the slab-house period,²¹ then was frequently called the pit-house era, and later became known as the Pre-Pueblo. The tendency for house types to lag and carry over into subsequent stages in the peripheral districts vitiated the first two names, and the fact that the Basket Makers were unquestionably prepuebloan suggested that a new designation would be advisable. Since the stage represented by these remains unquestionably coincides with the inception of the Pueblo periods, it has seemed only logical to call it Pueblo I.²²

Pueblo II was the unit-house period, which was marked by widespread distribution of life in small villages. The type forms of structures for this stage are found in the nuclear region along the San Juan.²³

Pueblo III, the classic pueblo era, was the stage of the large urban centers, great developments in the arts and industries, and marked local specializations. The outstanding examples of terraced communal structures characteristic of the period are to be found in the Chaco Canyon, in northwestern New Mexico;²⁴ on the Mesa Verde, in southwestern Colorado;²⁵ at Aztec, in northern New Mexico.²⁶ In the Kayenta or Marsh Pass district of northeastern Arizona the small pueblo structures held on until very late in the period; in fact, the Proto-Kayenta type of house²⁷ was still occupied during the great Chaco Canyon phase of Pueblo III. The structures in the peripheral parts of the area were more modest, rather provincial in their nature. A good example of this was found in southeastern Nevada;²⁸ at

²¹ Kidder, A. V., and Guernsey, S. J., 1919, p. 210.

²² For details on Pueblo I sites and discussions of the period see: Kidder, A. V., and Guernsey, S. J., 1919; Kidder, A. V., 1924; Morris, E. H., 1919 *b*; Roberts, F. H. H., jr., 1930, 1931. In the Kidder and Morris papers the term "Pre-Pueblo" is used, but it is synonymous with the present Pueblo I.

²³ Fewkes, J. W., 1919, pp. 12, 16, 39-40, 50-51; 1923 *a*, pp. 102-105; Martin, P. S., 1929; Prudden, T. M., 1903, 1914, 1918; Kidder, A. V., 1924, pp. 124-126; the term "early Pueblo" used in this reference is synonymous with the present Pueblo II.

²⁴ Hewett, E. L., 1921, 1922, 1930; Judd, N. M., 1922, 1923, 1924 *a*, 1925, 1926 *a*, 1927; Pepper, G. H., 1920.

²⁵ Fewkes, J. W., 1909 *a*, 1911 *b*, 1917; Nordenskiöld, G., 1893.

²⁶ Morris, E. H., 1915, 1917, 1918, 1919 *a*, 1921 *a*, 1924, 1928; Nelson, N. C., 1917.

²⁷ Kidder, A. V., 1924, pp. 72-73.

²⁸ Hayden, Irwin, 1930 *b*.

Wupatki in central Arizona;²⁹ on the upper Little Colorado River in eastern Arizona;³⁰ and in the ruins of the Upper Gila.³¹ There are a number of good illustrations of centers belonging to the closing days of the period when the abandonment of the northern nucleus had begun. Kitsiel and Betatakin³² in the Kayenta district fall into that category. The Mesa Verde period at Aztec, N. Mex., represents the stage³³ and in eastern Arizona is Kintiel or Wide Ruins³⁴ the cliff ruins in Mummy Cave in Canyon del Muerto and a portion of Casa Blanca, the White House, in Canyon de Chelly.³⁵ Farther south in the same State are the ruins called Showlow.³⁶ In the Rio Grande area in New Mexico the closing days of Pueblo III are represented by sites comparable to that at Bandelier Bend, now called the Forked Lightning ruin, in the upper Pecos Valley.³⁷

The pottery from the various sites is typical both of the period and of the locality. The structure, finish, style of decoration, and general characteristics are such that it is possible to recognize a vessel from the Mesa Verde, the Chaco Canyon, the Kayenta, or the upper Gila, and that it is of the Pueblo III period. In this connection it is significant to note that from practically the very beginning of ceramic manufacture there were two distinct techniques in finish and pigment content. There is a definite correlation between these and the two phases of Pueblo I. The subsequent stages in the same areas were marked by a continuation of the features. In the west the pigment used in ornamentation was a carbon mixture, while in the east it was an iron paint.³⁸ Where the carbon paint was employed the vessels were polished over the decoration. On the other hand, the iron pigments were applied after the surfaces of the jar or bowl had been worked over with the polishing stone.

The most exceptional vessels of Pueblo III, from the decorative standpoint, come from the Mimbres Valley in southwestern New Mexico.³⁹ The Mimbres people lagged perceptibly in house building, but they produced a profusion of naturalistic decorations on their pottery which was unequaled in the Southwest. This was an entirely indigenous development. It probably was the contribution of a single individual genius who influenced the other potters and

²⁹ Fewkes, J. W., 1904 (called Black Falls), 1926.

³⁰ Roberts, F. H. H., jr., 1931, pp. 90-109.

³¹ Hough, W., 1907.

³² Fewkes, J. W., 1911 *a*; Judd, N. M., 1930; Kidder, A. V., 1924, pp. 68-72.

³³ Morris, E. H., 1919 *a*, 1921 *a*, 1924.

³⁴ Fewkes, J. W., 1904, pp. 124-133; Mindeleff, V., 1891, pp. 91-94; Haury, E. W., and Hargrave, L. L., 1931, pp. 80-95.

³⁵ Kidder, A. V., 1927 *b*; Mindeleff, Cosmos, 1897.

³⁶ Bandelier, A. F., 1892 *b*, pp. 391-393; Haury, E. W., and Hargrave, L. L., 1931; Hough, W., 1903, p. 301.

³⁷ Kidder, A. V., 1924, p. 87.

³⁸ Hawley, Florence M., 1929.

³⁹ Fewkes, J. W., 1914, 1916 *a*, 1923 *b*; Bradfield, W., 1931.

founded a decidedly local school.⁴⁰ That its influence was not felt in other sections was possibly due to its late inception in the Pueblo II period. There is no question but that it made its appearance when the northern centers of the period were well under way. Investigations in southeastern Arizona have shown that the Mimbres pottery was contemporaneous with the non-Pueblo red-on-buff wares of the Gila Basin⁴¹ and the early form of the latter seems to coincide with the black-on-white of the Tonto Basin-Roosevelt Lake region which is of late III development.⁴²

Fragments from Mimbres bowls were recovered from the upper levels of a dump heap in the Chaco Canyon. Since that particular refuse mound was deposited at the end of the Pueblo III phase, when the abandonment of the houses was already under way, it may be assumed that the Mimbres culture was quite late in its florescence. A recent publication places the Mimbres development in Periods I, II, and early III, and makes its decline contemporaneous with the beginnings of the San Juan cultures.⁴³ In view of the evidence just presented, together with the fact that the final stage of the Mimbres seems to have been in existence when the culture of the Gila Basin-Pueblo fusion was under way and the Casas Grandes in northern Mexico was developing, as the report indicates, its degenerate period must have occurred near the end of Pueblo III. The Gila Basin-Pueblo hybrid culture began at the end of III and Casas Grandes probably belongs to period IV.⁴⁴ Finds of a late form of Upper Gila pottery in the final Mimbres stage also show that it was well along toward the end of III. Similar objects in northern centers have come from horizons, indicating that they were on the verge of collapse, in fact had already been largely vacated, when the vessels reached them. Considering all of these factors and allowing time for the spread of traded objects, it would appear that the major phase of the Mimbres activity coincided with the great era in the north, prior to the beginning of the movement which culminated in the abandonment of that portion of the area.

Pueblo IV is the designation for the period characterized by the redistribution of peoples, following the complete abandonment of the northern frontiers, the cultural decline and the establishment of new communities in the Rio Grande and Little Colorado regions and the emergence of the hybrid Gila Basin centers. There are really two phases to this period. The first covers the stage of fluctuations, migrations, and the springing up of new nuclei, extending down to the time of the arrival of the Spaniards. The second was

⁴⁰ Kidder, A. V., 1924, pp. 101-104.

⁴¹ Sauer, C., and Brand, D., 1930.

⁴² Hawley, Florence M., 1930, chart.

⁴³ Nesbitt, P. H., 1931.

⁴⁴ Amsden, Monroe, 1928, p. 48.

of shorter duration. It covers the interval from the appearance of the first explorers until the final subjugation of the Pueblos after the collapse of their temporarily successful revolt against the invaders. Ruins belonging to the early phase of IV are Chevlon, Homolobi, Chaves Pass,⁴⁵ the final stage at Showlow,⁴⁶ a village, previously mentioned, which had its beginnings in the closing days of Pueblo III; farther north in the Jeditoh Valley were the centers of Kokopnyama and Kawaiokuh;⁴⁷ and not far distant north and west were Küchaptüvela (first Walpi) and Sikyatki.⁴⁸

The great ruins in the southern part of Arizona which are called Casa Grande⁴⁹ are representative of the mixed culture produced by the fusion of peoples drifting in from the Pueblo area and those who had an independent development in the Gila Basin. This started late in Pueblo III, but the major part of its existence fell in the early phase of IV.

There are numerous examples of the first stage of IV in New Mexico. Clustered in the vicinity of Ramah, just east of the Zuñi Reservation, and some miles south at Inscription Rock (pl. 1) are a number of ruins belonging to that period. East of the Rio Grande in the Galisteo Basin are three which seem unquestionably to belong in that category. These villages were founded rather early in IV and were occupied until practically the end of the phase. They are Colorado, Shé, and Blanco.⁵⁰ Farther north were the pueblo of Rowe⁵¹ and the old north terrace of Pecos.⁵² These villages began at approximately the end of Pueblo III and continued into IV. Pecos, of course, was occupied throughout this entire period and continued into the following stage. On the Pajaritan Plateau, west of the Rio Grande, were the centers of Puyé and Tyuonyí.⁵³ The latter were somewhat later in their inception than the others but fall within the early phase. They were probably abandoned just prior to the arrival of the Spaniards, although they were temporarily reoccupied during the revolt against them.

The second part of the fourth period, the early historic, is represented by many ruins and villages. In the Hopi district, in Arizona, were Awatobi,⁵⁴ Oraibi, Kisakobi,⁵⁵ the latter being the second Walpi

⁴⁵ Fewkes, J. W., 1904, pp. 23-34, 56-111.

⁴⁶ Haury, E. W., and Hargrave, L. L., 1931.

⁴⁷ Haury, E. W., and Hargrave, L. L., 1931; Hough, W., 1903, pp. 337-346; Mindeleff, V., 1891, pp. 50, 51, 52-53. Mindeleff's Mishiptonga is the present Kawaiokuh.

⁴⁸ Fewkes, J. W., 1898, pp. 585-586, 631-742.

⁴⁹ Fewkes, J. W., 1912; Gladwin, H. S., 1928. Casa Grande is not the same as Casas Grandes, the northern Chihuahua center, with which it is frequently confused. The two were contemporaneous, however.

⁵⁰ Nelson, N. C., 1914, pp. 74-93; 1916, p. 179.

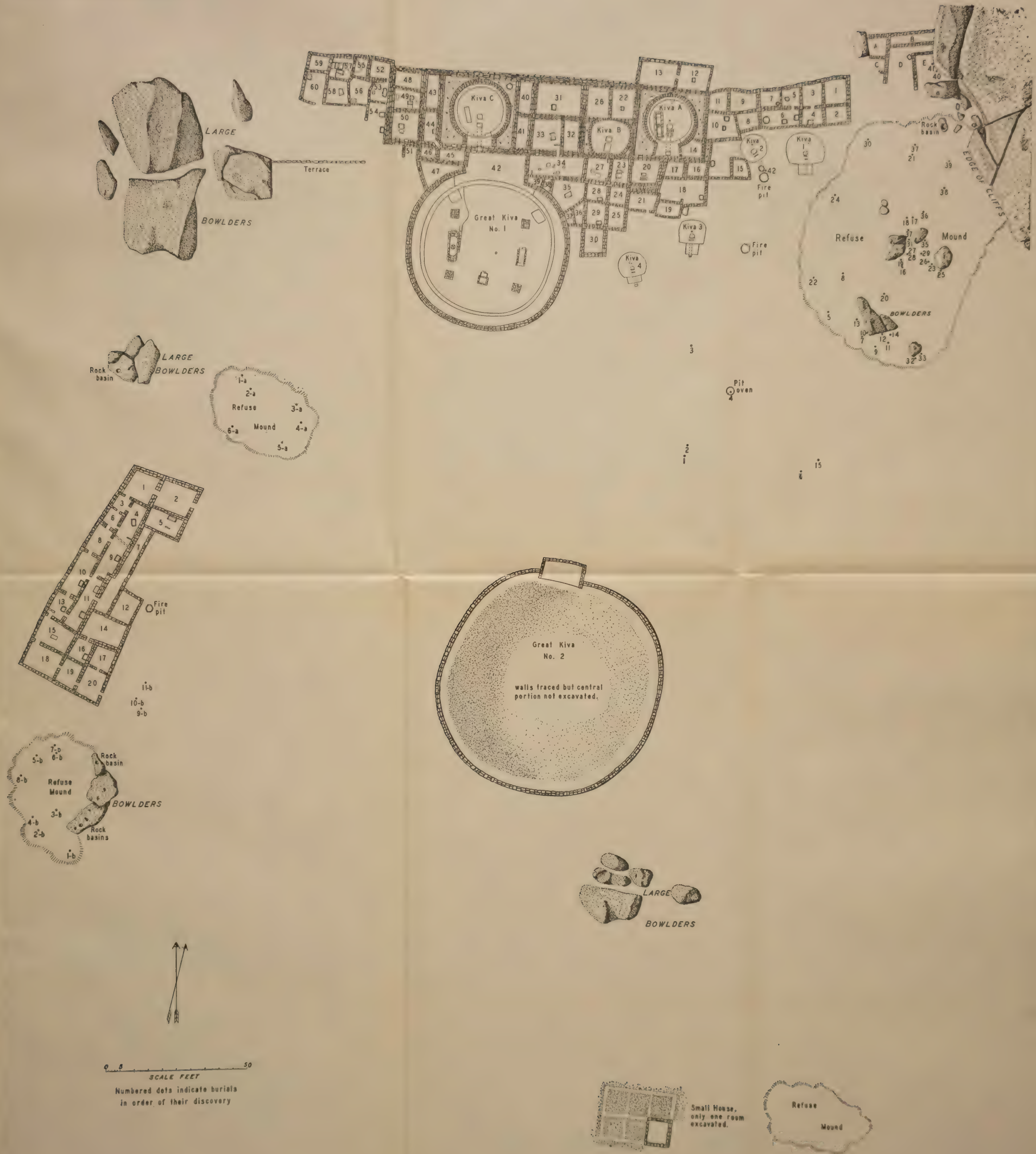
⁵¹ Guthe, C. E., 1917.

⁵² Kidder, A. V., 1924, p. 86.

⁵³ Hewett, E. L., 1909 *a, c*.

⁵⁴ Fewkes, J. W., 1898, pp. 592-631.

⁵⁵ Fewkes, J. W., 1898, pp. 585-586.



MAP OF RUINS AT MOUTH OF RED PAINT CANYON

Numbered dots indicate burials

village. The Zuñi province in western New Mexico had six villages, of which Hawikuh⁵⁶ is the best known. The Galisteo Basin villages included San Cristobal and San Lazaro,⁵⁷ and to the north there was, of course, the settlement at Pecos.⁵⁸ There is, as would be expected, a certain overlapping. All of the places cited were thriving villages before the Spaniards arrived. Pecos was occupied until 1838 and Oraibi in Arizona is still inhabited. Hawikuh was abandoned in 1670, Awatobi was destroyed in the autumn of 1700, and San Cristobal and San Lazaro were apparently deserted at about the same time. Many of the early historic period villages in the Rio Grande region and those of the Zuñi district were abandoned at the time of the Pueblo revolt, 1680-1696, and were never reoccupied.

Period IV is ceramically distinct both from the preceding and the following stages. The black-on-white pottery which had been the outstanding form from Basket Maker III to the end of Pueblo III passed out of existence early in IV and there was a great outburst of colored wares. In the Rio Grande and Zuñi areas the latter were characterized by glazed decorations. That style of ornamentation had reached its peak and was on the decline at the time of the arrival of the Spaniards. Its vogue terminated during the period of the revolt and although the people have continued to make colored vessels the decorations have been applied in dull paint.

The fifth and last period in the Pueblo group is that of the modern villages. This stage is better known to the general public than are those of the preceding horizons, with the possible exception of that of the great cliff houses. Along the Rio Grande are Taos, Santa Clara, San Ildefonso, Tesuque, and Isleta, to mention but a few. Some of these date from Pueblo IV, but for general purposes they fall into the suggested grouping. Farther west is Acoma, which was inhabited when Coronado first entered the country; still farther west are the Zuñi towns, which really date from the end of the revolt; and in Arizona are the various Hopi villages. With the exception of Oraibi, none of the Hopi towns occupies the site on which it stood in the sixteenth century and most of them do not antedate the early eighteenth.⁵⁹ Following the Pueblo revolt Walpi (Kisakobi), Mishongnovi, Shumopovi, and Shongopovi were removed from their locations at the base of the mesas to the summits where they now stand.⁶⁰ Much of the material used in the present houses, especially the timbers, was salvaged from the older structures and the result is that they give an appearance of being more ancient than they really are.

⁵⁶ Hodge, F. W., 1918 *a*, *b*.

⁵⁷ Nelson, N. C., 1914, 1916.

⁵⁸ Kidder, A. V., 1924.

⁵⁹ Fewkes, J. W., 1898, p. 578.

⁶⁰ Hodge, F. W., 1916, p. 259.

People interested in the story of the growth of the sedentary culture of the Southwest are rightfully desirous of knowing upon what grounds it can be stated that the various stages occurred in the order outlined in preceding pages. The evidence was obtained from stratigraphy, a study which deals with the order and relative position of the various cultural horizons. When an undisturbed layer of deposits containing a group of objects is found overlying another layer in which there are articles of a different type there is no question but that those from the upper level are the more recent. When the ruin of one type of house is found to rest upon a mound formed by the débris of another it is apparent that the upper one is the more recent. It will be recalled that an early paragraph in this introduction pointed out the fact that features peculiar to the stage called Basket Maker III were found overlying those of the group termed Basket Maker II. These positions have been consistent in so many caves that there can be no doubt of their sequence. Furthermore, ruins of Pueblo structures superposed on Basket Maker remains have been observed at so many different places that the priority of the latter can no longer be questioned.⁶¹ Similar conditions have been observed in the relationship between various Pueblo horizons. At Pueblo Bonito, in the Chaco Canyon, remains of Pueblo I houses were found 10 feet (3.048 m.) beneath the foundations of the large ruin.⁶² Other sites in the Chaco region have shown Pueblo II ruins resting upon Pueblo I remains. Superposition has also been found in the southern Colorado districts⁶³ and in eastern Arizona.⁶⁴

Where there is not an actual superposition of buildings there are other ways of establishing a relative sequence. Study of the various phases has shown that certain characteristic pottery types are associated with each. The order in which the different ceramic forms were developed has been determined by stratigraphic evidence obtained from the refuse mounds at the larger sites. In the material comprising such a mound, provided it has not been disturbed, the oldest potsherds are found at the bottom and the most recent at the top. Hence, if the kind of pottery found at one site is of the type occurring at the bottom of such a deposit and that from another ruin compares with the material from higher levels it is obvious that one is older than the other. On the basis of this kind of data the cultural sequence has been clearly shown at several different centers and the period order definitely established.⁶⁵ Pot-

⁶¹ Cummings, Byron, 1915, p. 274; Guernsey, S. J., and Kidder, A. V., 1921, pp. 3, 114-115; Roberts, F. H. H., jr., 1929 b, p. 71.

⁶² Judd, N. M., 1926, p. 82.

⁶³ Martin, P. S., 1930, pp. 24-33; Roberts, F. H. H., jr., 1930, p. 60.

⁶⁴ Roberts, F. H. H., jr., 1931, pp. 85, 93.

⁶⁵ Judd, N. M., 1927, p. 168; Kidder, A. V., 1924, pp. 18-20; Kidder, M. A., and A. V., 1917, pp. 340-353; Nelson, N. C., 1916.

sherds also may be used as an indication of the relative age of different centers. Fragments from Mesa Verde bowls found in late Chaco Canyon ruins, late Chaco pottery appearing in association with Mesa Verde vessels in Proto-Kayenta sites, and Proto-Kayenta potsherds being present in the Chaco is clear evidence that a certain contemporaneity existed between them. The fact that no true Kayenta material has been found in either a Mesa Verde or a Chaco Canyon site, together with the indication that it is subsequent to the Proto-Kayenta, shows that they antedate that phase. In this connection there is a factor which constitutes one of the most fundamental principles in archeological investigations. When sites of two different cultural stages are found in the same region and objects from A are found in ruins belonging to B but never vice versa, the first may properly be considered the older.⁶⁶ This explains why the occasional presence of a Mesa Verde or Chaco potsherd in a Kayenta ruin need not imply contemporaneity nor cause confusion. It also illustrates another principle which all too frequently is passed over, and that is, the stage to which a site belongs should be determined by the latest material in it, unless there palpably has been an intrusion of later objects into an older horizon. In the majority of cases such an event can easily be determined.

One question which is always foremost in the minds of students is that concerning the actual age and dates for various periods. Until recently it was difficult satisfactorily to answer it. Where the site involved fell within the final stage of Pueblo IV or was one of the V group it was comparatively simple to give a fairly accurate date because reference could be made to actual historical records. From the year of the arrival of the Spaniards back into the older horizons the problem was quite different. It was necessary to correlate objects with datable sites and to postulate the time element by comparing certain stages with the historical period and its length. Through the efforts of Dr. A. E. Douglass, however, a definite method of age determination has now been provided.

Doctor Douglass in making a study of climatic conditions in the Southwest turned to the growth rings of trees in an effort to obtain evidence on the occurrence of wet and dry years, and the extent of drought periods and intervals of moisture. In doing this he developed a method whereby he could tell whether the trees from which logs had been cut were growing at the same time or to what degree their life periods overlapped. Beginning with trees whose actual cutting date was known, he was able to devise a definite historical chart for ring growth going back to 700 A. D. By comparing the rings in any given tree with the chart he is able to tell

⁶⁶ Guernsey, S. J., and Kidder, A. V., 1921, p. 115, note.

when the tree was cut. Since the beams used in the construction of houses were once trees it has been possible to check their rings with the historical chart and obtain a series of dates for a large number of the structures in the Southwest. Hence, archeologists can now give rather accurate statements concerning the calendrical period of certain centers.⁶⁷ It was found that Pueblo Bonito contained timbers cut during the interval from 919 to 1130, A. D.; that the Aztec ruin was being erected during the years 1110 to 1121; the great cliff houses of the Mesa Verde were being built between 1073 and 1262; Betatakin disclosed a series of dates from 1260 to 1277; Kitsiel, 1274 to 1284; Kawaiokuh, 1284 to 1495; Kintiel, 1275; and others too numerous to mention here. Doctor Douglass's paper contains a considerable list.

On the basis of the information obtained from the dating of many ruins by the Douglass method and from archeological evidence where timbers suitable for study could not be secured it is possible to assign a time scale to the various periods. This is not done with the idea of definitely isolating each stage between two dates, because as previously pointed out there was no sharp break between periods, but is presented solely in an effort to facilitate comprehension of the chronological sequence. Bearing this in mind, it may be said that Pueblo V dates from 1700 to the present. Pueblo IV, phase *b*, 1540 to 1700; phase *a*, 1350 to 1540. Pueblo III, phase *b*, when the abandonment of the northern borderlands was under way and the people were drifting south, 1200 to 1350; phase *a*, the classic era, 950 to 1200. At this point the definite criterion of age is no longer available, at the present time, and for the preceding stages it is necessary to postulate the approximal dates. Pueblo II was the period of the perfection of the stone type of house and sites of the period give evidence of a lengthy occupation. It has been fairly well established that the farther back into a primitive culture one goes the slower he finds the development to have been. In view of this it would be plausible to think that the period must have covered an interval at least equal to, if not longer than, Pueblo III, *a*. Allowing 250 to 300 years, on this basis, the beginning of Pueblo II should be placed somewhere in the seventh century. Pueblo I was even longer in its duration, in all probability, because it was during this stage that the Pueblo peoples penetrated into the area, that there was a fusion of old and new stocks, and that many changes were made in the culture, and new features were developed. Taking all of this into consideration, it would seem that 500 years would be a fair estimate for the extent of Pueblo I, thus placing its beginning at approximately the end of the second century. In view of the developments

⁶⁷ Douglass, A. E., 1929.



1, Ruins; 2, Chaco Canyon; 3, Mesa Verde; 4, Kayenta; 5, Little Colorado; 6, Upper Gila; 7, Mimbres; 8, Rio Grande; 9, Gila Basin; 10, Pueblo Grande; 11, Peripheral Utah.

which took place during the Basket Maker stages that group may have filtered into the region from 1,500 to 2,000 years earlier. Eventually there will no doubt be accurate dates for all of these periods, because timbers from these horizons have been secured for study. As yet, however, it has not been possible to tie them to the historical chart since they antedate its earliest growth rings.

THE ZUÑI REGION

Compared with other districts in the Southwest, the Zuñi region in central western New Mexico furnishes an unusually advantageous environment for a sedentary people. It is located along the boundary line between the Navajo and Datil sections of the Colorado plateaus. Its northern part consists of young plateaus with only moderately deep canyons, the relief is not nearly so pronounced as that of the canyon lands section to the north, and its southern fringes are encroached upon by the lava flows and volcanic necks characteristic of the region east and south.⁶⁸ At the east, rising from the broken, rolling terrain south of Gallup and extending southeast to merge with the plateau which stretches westward to Arizona, are the pine-clad Zuñi Mountains. From the western slopes of the range flow a number of small streams, which ultimately combine to form the Zuñi River. Chief among these are Pescado and Nutria Creeks. Pescado Creek drains the broad, shallow valley lying along the southwestern edge of the mountains, breaks through the series of small mesas which dot the valley floor, moves northwest for some distance, and then curves toward the southwest. From the town of Ramah, where it has cut through the ridge of mesas, it traverses a valley 1 to 2 miles (1.609 to 3.219 k.) wide, whose bordering walls increase in height from 200 to 600 feet (60.96 to 182.88 m.) before it passes through a narrow gorge into the Zuñi Basin proper. Small canyons and ravines empty into it from either side, and it is joined from the northwest by Nutria Creek just before it cuts through the uplift which forms the eastern boundary of the Zuñi Valley. (Pl. 2.)

Nutria Creek rises toward the northern end of the Zuñi range. Near its headwaters it flows through quite narrow canyons, but eventually passes into a comparatively broad valley as it moves in a southwesterly direction to join the Pescado. (Pl. 3, a.) It also has many small tributary canyons, the longest of which come in from the north. Near its sources the stream is fairly large and supplies the water used for irrigating the fields in the vicinity of Nutria. During the summer months, except after heavy rains, the flow is very meager and it is not unusual to find that considerable stretches of the stream bed are dry. Water can generally be

⁶⁸ Fenneman, Nevin M., 1928, pp. 338-342, map.

secured, however, by digging in the sand at the bottom of the parched channel. There are also a large number of springs scattered along its course, so that for most purposes there would be a sufficient supply for the ordinary uses of a rather large group of people. From just below Nutria to the mouth, the bed of the creek is too far below the general surface level to permit the use of irrigation, although water from the side canyons could be diverted for such purposes. Consequently the creek would be of no value in the nurturing of crops.

The Zuñi Basin is a comparatively broad plain stretching away to the southwest. It is bounded on the north by a series of low mesas of which the outstanding feature is the Zuñi buttes. The southern border consists of the precipitous slopes of the plateau with Thunder Mountain, also called Corn Mountain, towering 1,000 feet (304.8 m.) above the sandy level of the plain, prominently in the foreground. The valley broadens out along the river to the southwest. Its southern boundary breaks up into a series of small buttes and mesas and the terrain to the north fades into the rolling country extending westward into Arizona.

The higher portions of the region are covered with pines, the lower levels have cedars and piñon trees, and the floors of the valleys are overspread with sagebrush and grass. (Pl. 3, b.) The soil in general is sandy but suitable for raising considerable crops when sufficient moisture is available. Because of the small amount of rainfall the present, and the former, inhabitants have chosen sites for their fields where the precipitation may be increased by the overflow of water derived from the higher ground. Some are located beneath the rock escarpments and others on the valley floors where the run-off from the canyons spreads out over an alluvial fan. Such places must be chosen carefully, because it is just as essential that the field should not be buried or washed out as it is that the plants be properly flooded. Most of the many ruins scattered throughout the district are located in close proximity to ground suitable for that purpose.

Game seems to have been fairly plentiful in the region, judging from the various bones present in the refuse mounds, and consisted of deer, bear, wolf, wild cat, coyote, several kinds of rabbits, squirrels, and prairie dogs. The people no doubt had a moderate supply of meat with which to vary their diet. In recent years wild animals have become rather scarce, due to white hunters, and the Indians now depend on their sheep and goats for that part of their food supply. The latter are a modern acquisition. Prior to the Spanish conquest and colonization there was no domesticated livestock, the Indians having tamed only the dog and the turkey.

Climatic conditions in the region are rather favorable. The winters are not too severe, although considerable snow falls in the eastern portion close to the slopes of the Zuñi Mountains, and the summers are not unbearably hot. There is only a moderate rainfall. During the spring months high winds are a common occurrence. The growing season is short. Because of the high altitude, the greater part of the district ranging from 6,000 to 7,000 feet above sea level, heavy frosts continue until the end of May and begin again about the middle of September. As a result of the long period of experimentation, however, the Pueblos have produced corn, melons, squash, beans, and other vegetal forms which are adapted to a short season.

In spite of its many qualifications the Zuñi region does not seem to have been occupied to any extent until comparatively late in the prehistoric era. There are a few widely scattered sites of the Pueblo I stage and an even smaller number, apparently, belonging to II. Beginning with period III a larger number moved into the district and ruins dating from that phase are fairly numerous. The peak was reached in IV and there were a great many comparatively large villages in various parts of the district. At the present time there are just four—the main pueblo of Zuñi and the farming villages of Nutria, Pescado, and Ojo Caliente. There are a number of families who live on farms the year round, but most of the people return to the main village for the winter.

HOUSE REMAINS

The cluster of ruins excavated during the field season of 1930 is located in the northeastern portion of the Zuñi Reservation at the east side of Red Paint Canyon where it opens into the broader Nutria Valley. (Pl. 2.) Numerous investigations and extensive explorations have taken place in that region since it was first traversed in 1540 by Coronado and his rapacious soldiery in their futile pursuit of a golden mirage. Few, however, seem to have observed, and no one has recorded, the existence of these particular ruins. They were virtually unknown to the white inhabitants in the vicinity and many of the Indians were not aware of their presence. That they escaped notice for so long a time may be attributed to their inconspicuous nature. Lying on the talus at the foot of a series of low cliffs the stone and grass-covered mounds appeared, unless closely observed, to be a part of the natural formation. (Pl. 4, *a*.)

The remains were found to consist of three communal dwellings, a number of ceremonial chambers of ordinary size, and two large religious structures or great kivas. (Pl. 4, *b*.) When the investi-

gations were brought to a close two of the houses and a number of the ceremonial chambers had been excavated and three refuse mounds had been thoroughly explored for burials. The larger of the two houses, which for convenience has been designated A, was found to contain 64 rooms, 3 average-sized kivas, and had a great kiva joined to its southern side. (Pl. 5, *a*.) In front of the main building and completely subterranean in character were four more ceremonial chambers. The smaller of the two structures, denoted B, had comprised only 20 rooms and in contrast to its larger neighbor had contained no circular chambers. (Pl. 5, *b*.) Lying in the court formed by the two buildings, and completely detached from them, was the second great kiva. South of it was the mound covering the third house which had been a very small domicile. (Pl. 1.) It was not possible to excavate the isolated great kiva, but its walls were traced in order that the size could be determined and the structure properly plotted on the map. Only one room in the third dwelling, the small one south of the great kiva, was cleared of its accumulated débris, but this was sufficient to indicate that it had been of the same general character as the other small house, B.

HOUSE A

The largest of the houses shows only 60 rooms on the ground plan. (Pl. 1.) The other four chambers constituted a second story in the central portion of the building. The rest of the structure had been but a single story in height, although it may have had a terraced appearance because of its having been built on sloping ground. The investigations clearly demonstrated that it had not been erected as a complete edifice and that it had not been occupied in its entirety at any one time. There were several distinct stages in the development of the building. In the beginning there had been only a rectangular block of rooms and two kivas, or ceremonial chambers. Subsequently several more rooms and the great kiva were added. The dwelling was inhabited for a considerable period in that form and then further construction took place. The series of rooms south of the main section and east of the great kiva were erected. Ultimately the east and west wings were built, and the structure took on the outline shown in the drawing. The masonry in the walls of the later portions was inferior to that in the older section and the rooms have such irregular outlines that it hardly seems possible that they could have been built by the same group of people. (Pl. 6, *a*, *b*.) The ceremonial chambers dug into the earth in front of the structure appeared to have belonged to the later sections of the building.



a. Nutria Valley looking toward the southwest



b. Red Paint Canyon as seen from house B

VIEWS OF SURROUNDING REGION



a. At the beginning of operations



b. At the close of the season's work

THE SITE BEFORE AND AFTER EXCAVATION



a. View of house A from the east



b. House B and Great Kiva No. 2

THE RUINS



a. Wall construction in the old section of house A



b. Characteristic stonework in later additions to house A

TYPES OF MASONRY

The original dwelling was rectangular in shape and contained 13 secular or living rooms and two circular chambers devoted to the religious side of the community life. (Fig. 1.) Two of the living rooms in this part of the building were eventually remodeled into a kiva, while another room was made into two compartments by the erection of a partition. The building had been occupied for some time before this was done and the resulting chambers probably constituted a factor in the second stage of the life of the community.

Perhaps the most striking feature of the original building was that of the compact regularity of its outline. The only jarring note was that of the two small rooms at the west end of the structure, 45 and 46, which projected beyond the line of the main south wall. Indications were, however, that originally there were corresponding chambers at the other end of the building in front of kiva A. These would have balanced the plan and have produced a pleasingly symmetrical structure. Subsequent construction removed practically all traces of the rooms and beyond the suggestion that they once existed nothing could be learned of their character. Beneath the floors and walls of later rooms erected at that portion of the building were the remains of old foundations which gave rise to the supposition that counterparts of 45 and 46 had once stood there. The remains, unfortunately, were too fragmentary to make it possible to draw in the outlines of the rooms. Balanced structures are characteristic of the Chaco cultures, although two of the best-known ruins in that district, Pueblo Bonito and Peñasco Blanco, are decided exceptions. The majority, both large and small, evidence symmetrical ground plans.⁶⁹ This is also true of the outlying Aztec ruin.⁷⁰

There are a number of features, in addition to that of the plan of the building, which suggest that it may have been built by a Chaco people, or at least by a group which was under a marked Chacoan influence. The method of wall construction produced an effect which is very similar to that found in many of the Chaco structures, namely, the practice of laying several courses of thick stones, then several of thin ones, so that a banded appearance resulted. There are a number of varieties of this type of masonry and some differences due to the care with which the stones were put in place, but on the whole it is one of the outstanding characteristics of the ruins in the Chaco Canyon proper⁷¹ and is to be observed throughout the entire range of the culture which centered there. The Chimney Rock Pueblo in the extreme northeastern periphery in the Piedra district of southern

⁶⁹ Jackson, W. H., 1878, pls. LV-LVII, LIX.

⁷⁰ Morris, E. H., 1924, plan of ruin.

⁷¹ Jackson, W. H., 1878, pl. LXII, no. 2; Judd, N. M., 1927, fig. 160.

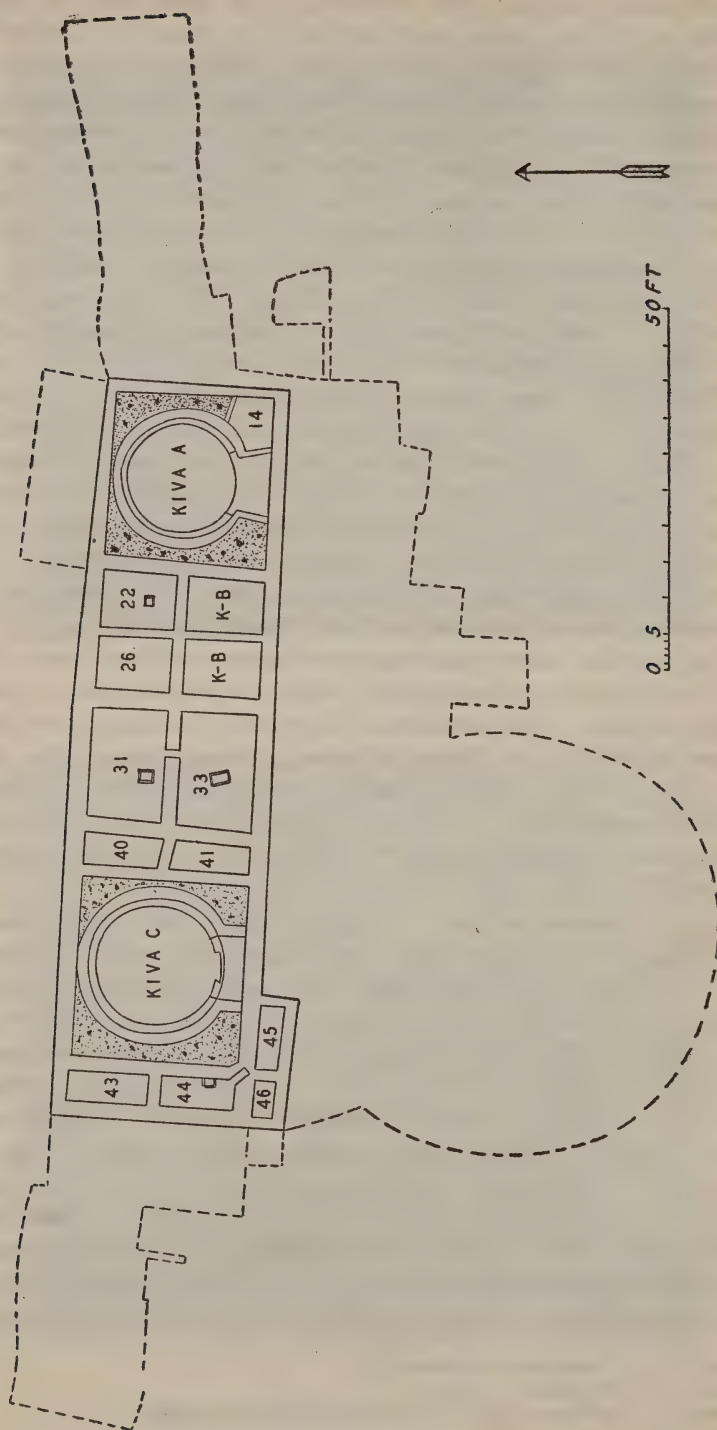


FIGURE 1.—Plan of original portion of house A. Dotted lines show extent of completed building

Colorado shows it,⁷² and Morris has called attention to the marked architectural similarity between the Aztec ruin and those of the Chaco Canyon.⁷³ One of the factors in this likeness is to be observed in the masonry in many of the walls. The work was not as well done in house A, but the walls do illustrate the feature. (Pl. 6, *a*.) The practice of chinking with potsherds, also frequently observed in Chaco ruins, did not prevail in this instance. Possibly this may be attributed to the fact that the original portion of the building was erected on a site which had not been occupied previously and on which there were no scattered fragments of pottery.

Another feature which suggests a certain Chaco architectural characteristic was found in the corner of room 44. Built into the wall was a cupboard or storage pocket which basically is of the same nature as the corner doorways found in Chaco ruins.⁷⁴ As a matter of fact, when the débris was being removed from the interior of the room and the opening first became apparent it was thought that it was one of the corner doorways and that it led into room 45. Subsequent work showed that such was not the case and that it had only been a storage place. Wall pockets of this type are so scarce that it seems that they must have been derived from the corner doorways. It may be that the builders here originally planned for such an aperture and for some reason or other did not complete it but, instead, finished it off as a cupboard. The inside was nicely plastered and on the floor were several bone and stone implements which showed that the place had been used for storage purposes.

The building was occupied for some time before the construction of the western tier of rooms and the great kiva was undertaken. This was shown by the fact that the floors and foundations of 42, 47, 48, 49, and 50 rested upon an accumulation of refuse, ashes, blow-sand, stone spalls, broken bones, and potsherds. When these chambers had been erected the ground plan of the structure was as illustrated in Figure 2. The relation between the floor levels in rooms 48, 49, and 50, and those of the older chambers to the east is illustrated by the sections *a* and *b* of Figure 2. One matter connected with these additions which would be of interest could not be determined from the evidence secured, and that is with respect to the actual building of the secular rooms and the large ceremonial chamber. There is no question but that rooms 48, 49, and 50 were erected as a unit and that 42, 47, and the great kiva constituted a single expenditure of effort. Whether the series of three living rooms represent the initial construction which was then followed by the building of the great kiva or vice versa, or whether they were erected simultaneously, could not

⁷² Jeancon, J. A., and Roberts, F. H. H., jr., 1923, pl. 17, lower.

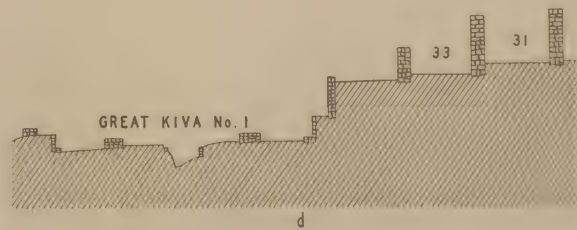
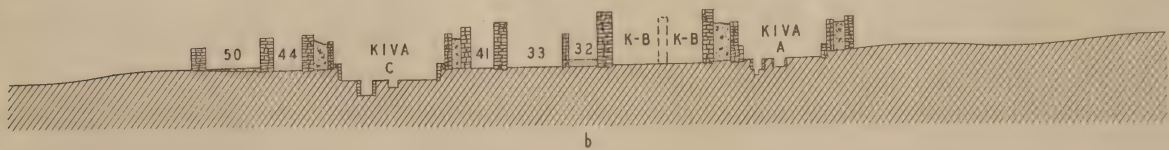
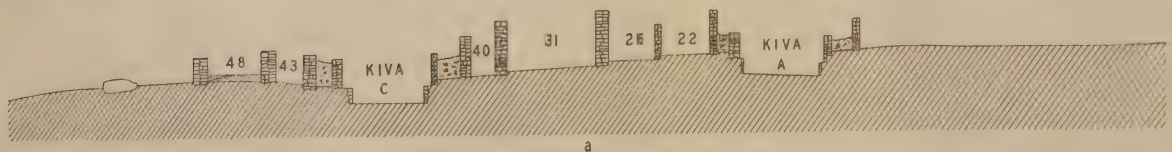
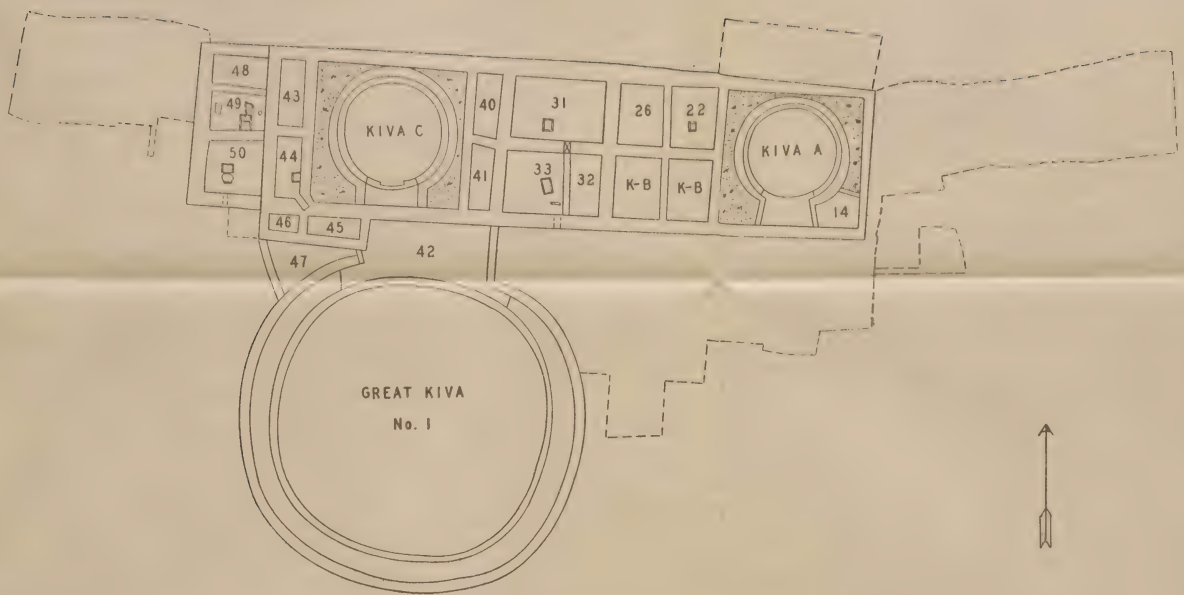
⁷³ Morris, E. H., 1919 *a*, pp. 104-105.

⁷⁴ Judd, N. M., 1922, fig. 117; Pepper, G. H., 1920, fig. 151.

be learned. It would be gratifying to be able to state that one or the other formed the first addition to the original structure, but since this can not be done it is fortunate that the actual precedence is not of great significance. The masonry in these newer portions indicated that the work was done by the same group of people, or at least in the same careful technique employed by the builders of the original and older section.

It was probably at about the same time that one of the original rooms was made into two compartments by the erection of a partition. This remodeling took place in room 33 and as a consequence room 32 was formed. The partition separating rooms 32 and 33 rested upon several layers of flooring, indicating that the large enclosure had been occupied during an interval of some duration before it was converted into smaller chambers. One of the interesting features connected with this bit of construction is that the doorway opening from room 31 into the original 33 was blocked by the end of the wall which separated the latter into two chambers. Here again the stonework in the wall was such as to indicate that it had been built by the same group of workmen as the others. In this instance it was again impossible to tell whether the work had actually been done at the same time as that in the other additions or was an independent procedure antedating or subsequent to it. At all events it unquestionably belonged to the same general stage in the development of the structure.

Certain minor features were added to room 33 at the same time that the wall separating it from 32 was built. These consisted of the cutting of an opening through the south wall to form a small doorway and the erection of a large slab of stone at some distance from the aperture and approximately at right angles to the partition wall and almost touching the latter. This stone seems to have functioned as a deflector to keep the air coming through the opening from blowing directly on the fire pit. That the slab was set up and the opening made at the time when the partition was erected was indicated by the fact that the small stones which formed the jambs, sill, and lintel were laid in the same kind of mortar as that used in the wall and contrasted with that which had originally been employed in the building. In both instances adobe mud had been used to make the filling employed between the individual and courses of stones but in the latter material there was considerable foreign matter, ashes and bits of charcoal, which was absent in the older. From the section *b*, Figure 2, it will be observed that the floor of 32 was raised above that of 33. This was accomplished by a sand fill which was apparently intentionally made. The floor was then laid on top of this material. There was nothing to indicate why a higher



0 5 50 FT

FIGURE 2.—Plan of second stage in growth of house A. a, b, c, d, Sections through building. Dotted lines show extent of finished structure 82148—32. (Face p. 32.)

level should have been desired and all that can be done is to call attention to the fact that it was present.

Chief interest in the additions to the building, except for the great kiva which will be considered in detail in connection with the subject of kivas, centers in rooms 49 and 50. Room 49 had a mealing bin, a place in which the stones used in grinding corn were set. This feature was not found in any of the other rooms belonging to the original block of the building. This does not indicate, as might at first be surmised, that the occupants of the chambers lacking such a provision for the preparation of meal did not grind their corn or that all of the milling was done in the one room. It has far greater significance in that its appearance was definitely associated with a change in the form of metate or grinding stone employed. The older rooms yielded metates of the trough or grooved variety while those in the bin in 49 were of the simple concave form. The trough type of milling stone was rarely used in a bin while the concave style, without raised borders, seems in the vast majority of cases to have been set in such containers. Furthermore, not one of the later rooms in the east or west wings or in the series erected east of the great kiva and south of the main block contained one of the trough-type stones. The change began with the occupation of the series 48-50 and from that time on the new type prevailed. This fact takes on additional importance in the light of what was observed at a ruin in the same general region during the investigations of the preceding summer. There in the remains of a pueblo belonging to the early part of period III it was found that the grooved or trough type of metate was the only form employed and that it was not used in bins.⁷⁵ From that and the present evidence it seems justifiable to conclude that the old grooved form of metate which had continued in use from Basket Maker times down to the classic Pueblo period began to be replaced, in this region, in the latter part of Pueblo III, and that the concave type dates from that horizon.

Room 50 is worthy of consideration because of the presence of several features not commonly found in the usual rectangular form of chamber. In addition to the rectangular fire pit near the center of the room there was a second shallower depression adjacent to it, a ridge of adobe plaster separating the two, and at the far side of the smaller pit an upright slab of stone. Beyond this, in line with the pits, was an opening through the south wall. This combination of vent, upright slab, and pits (pl. 7, *a*) is very suggestive of the ventilator, deflector, ladder box, fire pit complex found in the circular ceremonial chambers or kivas. In fact, this room is a counter-

⁷⁵ Roberts, F. H. H., Jr., 1931, pp. 154-155.

part of many which have been identified as rectangular kivas. The introduction to this paper, it will be recalled, pointed out the fact that in late prehistoric times the circular kiva gave way to the rectangular form in many districts. Also, that in the southern peripheries of the area many communities never had the circular type. If there had been no circular chambers present in this ruin, room 50 would have been considered an example of the rectangular ceremonial chamber. Since the occupants of the building had provided a number of orthodox religious structures, the problem of room 50 becomes more complex. There was nothing to indicate that it had been other than an ordinary living room, except for the ventilator-deflector features. Yet it would seem that the latter must have had some significance beyond that of mere utilitarian function, because they are so rarely present in secular rooms. They no doubt would have been advantageous in such enclosures, but for some reason the Pueblo people did not avail themselves generally of the benefit to be derived from them. Two additional rooms at this site had them, but they were noticeably absent from all the rest.

The evidence is not sufficient to warrant the drawing of definite conclusions, but it may be suggested that possibly here was an indication of the beginnings of a trend which reached its culmination in the holding of certain ceremonies in rectangular rooms. This may perhaps have been due to an influence from the southern districts where such practices prevailed. It should be explained that reference is not made to the development of the rectangular kiva, since it is probably an outgrowth of the circular form; rather is it intended to suggest that here there may be an indication that the custom of differentiating between fraternity and tribal rituals, so well exemplified at Zuñi, was unfolding. In Zuñi the headquarters of the various fraternities are in the ground-floor rooms of ordinary living houses, chambers in which the family eats, sleeps, and passes most of its time.⁷⁶ The same feature is found to some extent among the Hopi, where certain societies do not meet in the regular kivas but in an apartment of a dwelling house.⁷⁷ On the other hand, the rituals which concern the entire community are performed in the kivas. Because of the fact that a certain religious importance would be attached to such a room it is possible the ventilator-deflector complex was deemed essential, and for that reason incorporated in it. Be that as it may, they were present in room 50.

Another feature noticed in this same chamber was unique in the community. This consisted of the evidence that close to the foundations of the south wall, extending from the corner of the room almost

⁷⁶ Kroeber, A. L., 1917, pp. 197-198; Stevenson, M. C., 1904, p. 428.

⁷⁷ Mindeleff, V., 1891, p. 131.

to the ventilator opening, a small log had been incorporated in the wall. This took the place of a course of stones at that place. The wood was no longer present, but decayed fragments of it were in evidence and the plaster in the wall bore imprints of the pole. The use of timbers in such a fashion has been observed both in Pueblo Bonito and the great ruin at Aztec. The practice was not prevalent in general, however. The shallow pit between the fire pit and the deflector stone was probably where the lower end of the entrance ladder rested.

The building was probably occupied for some time in the form indicated in Figure 2. Then considerable changes took place and the outward appearance of the structure was modified to a marked degree. Evidence indicated that the stimulus for new constructional activity was the direct result of a calamity which descended, literally, upon the community. Several large boulders and a great amount of earth became dislodged and rolled down the talus slope, to crash against the rear wall of the building in the vicinity of kiva C and rooms 31, 40, and 43. That this occurred subsequent to the erection of the dwelling was shown by the fact that several inches of material containing ashes, charcoal, potsherds, and other refuse, underlay the mass of material which had come down the talus. That the landslide had not taken place after the complete abandonment of the pueblo was demonstrated by the level of occupation resting upon it. The descending débris did little damage to the walls, but the whole section of the building was abandoned and the series of new rooms east of the great kiva presumably were built to take its place. There is, of course, nothing to demonstrate definitely that the portion of the building referred to was vacated because of the fall of rocks and earth, but it was clearly evident that the occupants had moved out at some time during the life of the community and that the rooms had been used as repositories for refuse. The fact that the enclosures were completely filled with this kind of material shows that they served in such a capacity for an interval of some duration. Since no other cause for their abandonment could be determined, it was concluded that the landslide must have been responsible.

The new additions at this time were made in front of kiva A and east of the great kiva. They consisted of 15 rooms, practically twice the number of those which had been abandoned, most of which were considerably smaller than the older ones had been. In addition, it would seem that the two rooms which are marked "K-B" on the plans of Figures 1 and 2 were converted into kiva B. This probably was done so that there would be a chamber of that nature to replace kiva C, which was in the section of the building that had been abandoned. That the enclosure constituting kiva B had

not always been devoted to such a chamber was clearly shown by the fact that beneath the floor of the kiva were the remains of the foundations for the cross wall which had made the two rooms at that part of the building. Also, it could clearly be observed that portions of the original straight walls had been removed so that the circular one could be erected. On the south side the section of the straight wall had not been completely razed and a portion of it was to be observed where it was not entirely covered by the curved masonry. The top of the remaining part of the old wall was flush with the floor of the kiva.

Although the new series of rooms (fig. 3) are considered as representing a unit in the growth of the building, they were not erected simultaneously. This was shown by the abutting walls of the various inclosures. There probably was no appreciable lapse of time between the construction of the new elements, but there was a definite order. Rooms 17 and 20 were built first. These were followed by 23 and 27 and the latter possibly by 34. The exact position of the latter with respect to the others is not determinable. It unquestionably was subsequent to 23 and 27. What its order was in the remaining series is debatable, and putting it after 27 and prior to the others is more or less an arbitrary matter. There can be no question, however, that rooms 24 and 28 were later than 23 and 27 and that 25 and 29 were next after 24 and 28. There is again some question in the case of room 30. It was subsequent to 25 and 29, but whether it preceded or followed the group 16, 18-21 could not be determined. In the case of the latter there is no question about the sequence in which they were constructed. Rooms 18 and 21 were built at the same time, but they were not erected until after 25 and 29 had been completed. Then rooms 16, the second 18, and 19 were added. Then the wall separating the two 18's was removed, and it became a single large inclosure as shown on the main ground plan of the ruin. (Pl. 1.)

One of the noticeable features in this new series of rooms was that of the presence of lateral exterior doorways. There were only two of these, to be sure, but they were an innovation since not one was observed in the older portions of the building. The convenience of ground level entrances is too apparent to need discussion. The ancient Pueblos, however, were rather sparing in their use of such openings in ground floor rooms, although they were made frequently in chambers of the upper stories. As a defense measure an unbroken outer wall on the ground level had great value. To gain entrance to the first floor rooms it was necessary to ascend to the roof by ladders and then to descend through a hatchway, again by means of ladders, into the chambers. At night, however, and during periods of stress the exterior ladders could be pulled up onto the roofs and

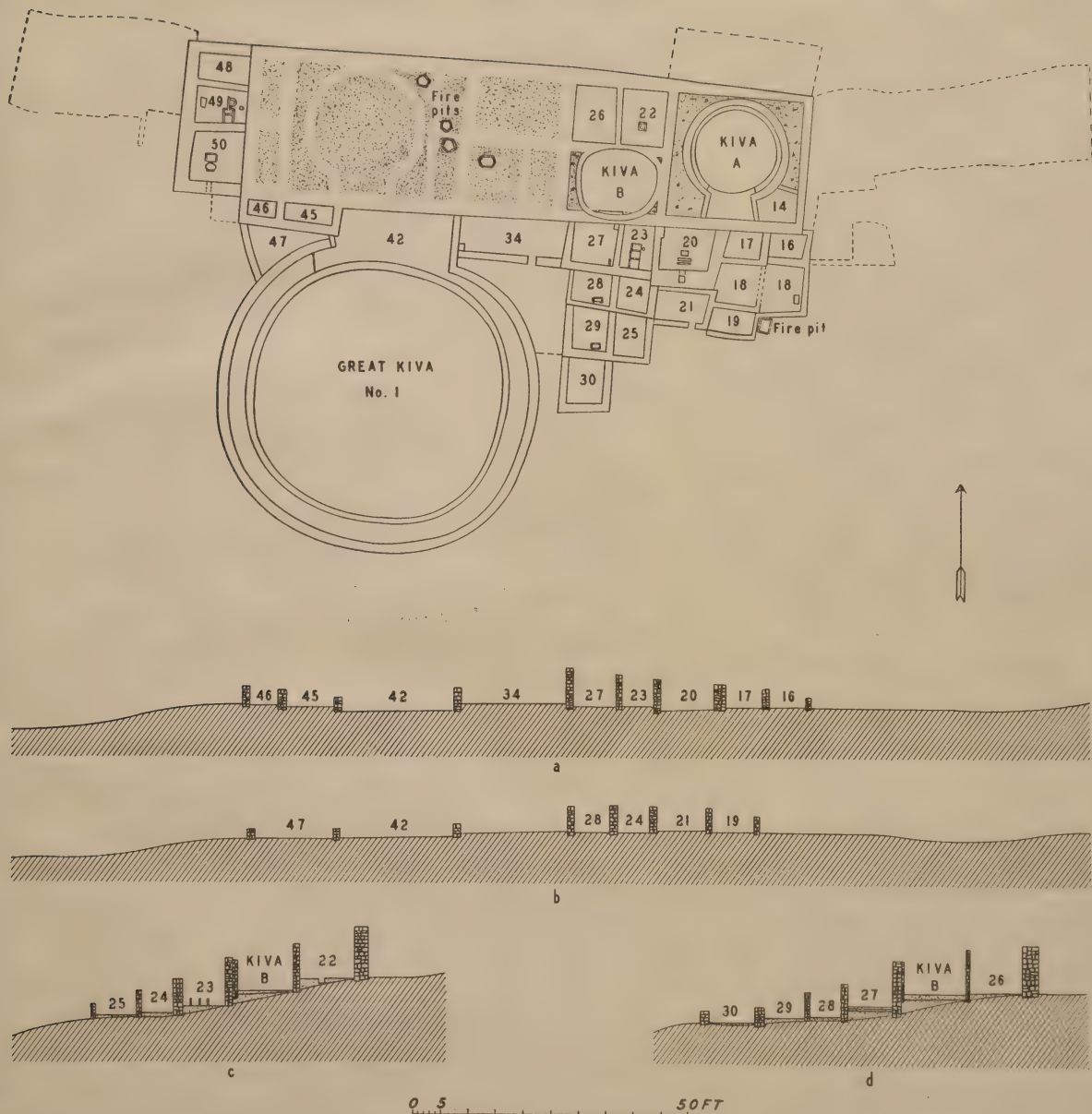
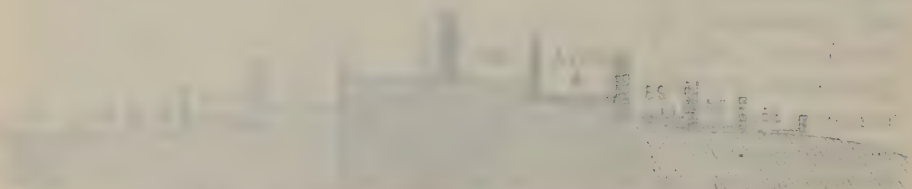
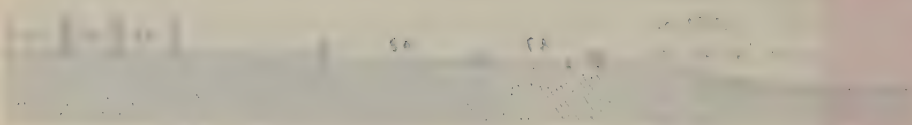


FIGURE 3.—Third phase in development of house A. Stippled portions indicate abandoned rooms and dotted lines the extent of the completed building. a, b, c, d, Sections through building



Scale 1" = 20'

Architectural drawing of a building complex.

the building thus be made less pregnable. The fact that two of the rooms in this series had first floor entrances would suggest that during the period when the community was developing to its present stage there had been little need for defense measures and as a consequence the people were emboldened to provide, in rooms 21 and 34, more suitable doorways. In the remaining chambers, however, the orthodox means of access was retained. As a passing observation it might be remarked that despite their efforts to make their dwellings as secure as possible the Pueblos frequently, as in the case of the present dwelling, erected their structures in fairly vulnerable positions. Enemies could readily have taken positions on the cliffs overlooking the building and hurled rocks and other missiles onto the roof, keeping the defenders inside, while others scaled the outer wall and gained a vantage point for a direct attack on the occupants.

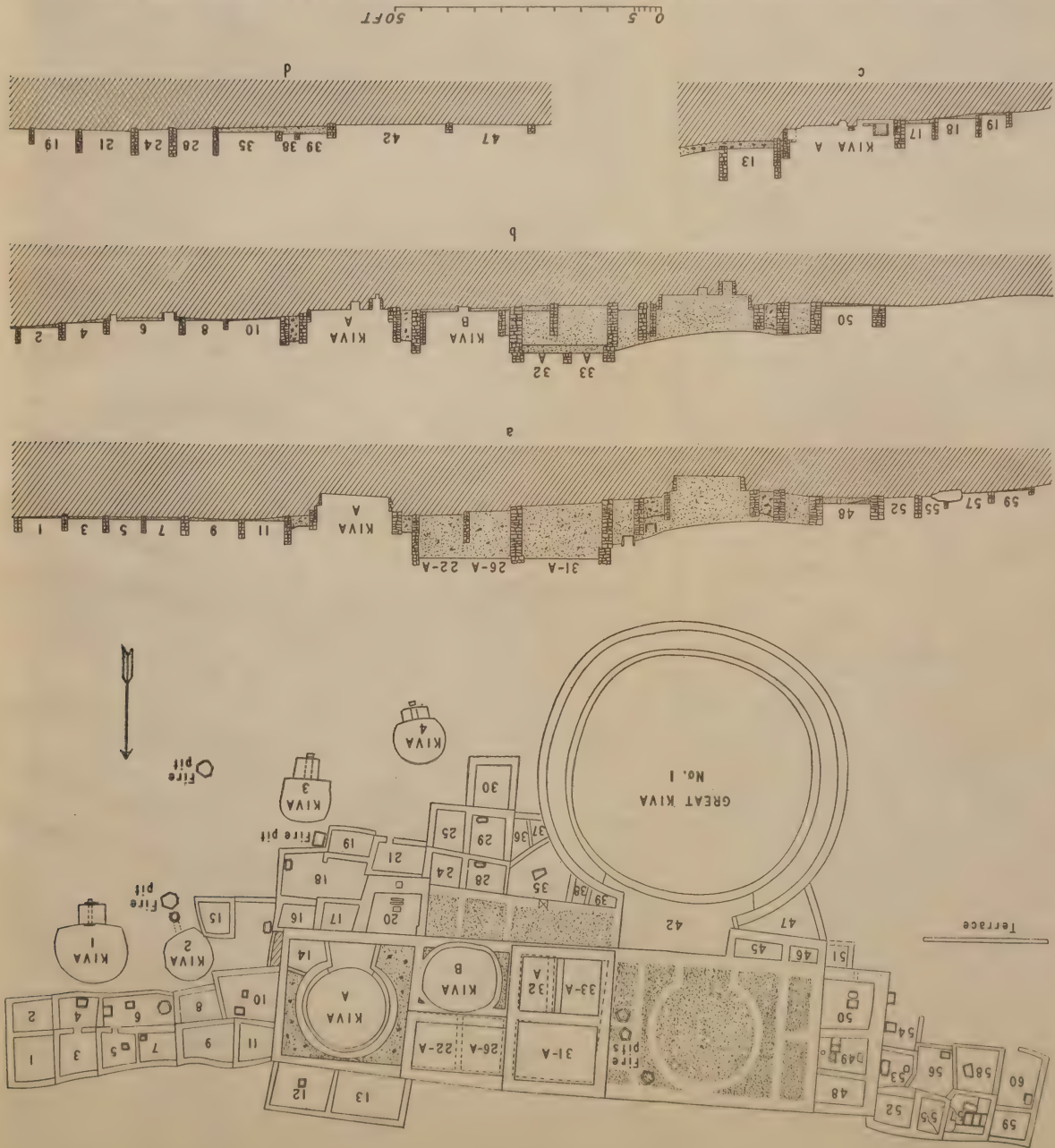
Only two of the rooms in the series 16-21, 23-25, 27-30, and 34 warrant further consideration. They are 20 and 23. Room 20 was another of the rectangular chambers which had the ventilator, deflector, ladder box, and fire-pit complex which suggests that such inclosures possibly served for more than mere habitation purposes. In this instance, however, the ventilator was actually in the form generally found in kivas. It did not consist of an opening passing directly through the wall. Instead there was a vertical shaft or flue rising to the roof level through the thick south wall. This form of ventilator may have been used in this instance because the builders had already planned the erection of another room to the south of 20 and did not wish to have an opening between the two. On the other hand there may well have been an entirely different reason, since the people do not seem to have been averse to such openings between chambers. The ventilator in kiva B consisted of a simple aperture extending through the wall into room 27. Consequently the most which can be done is to call attention to the form of ventilator in room 20 and suggest an explanation. A definite conclusion can not be drawn on the evidence obtained from excavations.

Room 23 was of interest because it had contained a mealing bin. Here three metates or milling stones had been included. In room 49 there were but two. Whether it was just coincidence that such had been the case or whether there is some significance in the difference in number can be answered only by speculation. Where mealing bins are of common occurrence the usual number of stones found in them is three. Occasionally there may be more, but in the great majority of cases three seems to have been the preferred number. Furthermore, the stones were graded. One was rather rough, one medium, and one fine. Judging from present-day practices among

the Pueblos, the custom probably was to proceed from the rough to the fine in the grinding process. In the case of the bin in room 49 having only two while that in 23 had three, it may be suggested that one reason for such a condition is that when the first was constructed the new order was just beginning and that experience showed that a third stone would be advantageous. Hence, when room 23 was equipped for grinding purposes another metate was added. In this connection it will be recalled that it was previously pointed out that room 48 and the bin located there marked the transition in the type of metate employed and the method of its placement. It is rather curious that in two instances in this building a room containing a mealing bin was located directly adjacent to a rectangular chamber containing elements usually found in kivas. This relation is shown in rooms 49 and 50 and 23 and 20. Whether this was a result of coincidence or had some special significance is not known. It has been deemed advisable to call attention to the occurrences, since future work elsewhere may throw some light on the question and give a clue to its possible import.

Due to the slope of the ground, the levels of the new rooms in front of the old portion of the building were lower and in a number of cases a certain amount of leveling off and filling in was essential. Indications were that there had been a certain amount of refuse in front of the structure when new operations were started. The people apparently did not trust the material as a base for the new walls, and accordingly dug through it to the old original ground level and placed their foundations on it. The rest of the material was smoothed off and used as a fill for leveling up the floors of the rooms. This feature is illustrated in the sections shown in Figure 3, *c* and *d*. In making these sections the old ground level was traced and recorded so that the proper relation between it and the various floors could be shown. These drawings also illustrate the possibility of the building having had a terraced effect. Had the ceilings of the various chambers been approximately the same height above the floor, then the rooms located higher up on the slopes of the talus would have projected somewhat above the others and the building would have presented a characteristic pueblo appearance without having any second story. A similar condition is to be observed at the present time in certain sections of the village of Zuñi.

At the southeast corner of the building, in the angle formed by the walls of rooms 18 and 19, was a large outdoor fire pit. Whether this pit dates from this stage or the one following can not be stated with definite assurance. Considering all things in general, however, it appears logical to think that it belongs with this series of rooms. Outdoor fire pits were used to a considerable extent by many of the



prehistoric Pueblo peoples, and their descendants continue the practice. There were other exterior pits in addition to the one just mentioned. In the section of the building which had been abandoned there were four. Two of these may have been of later date, but the others unquestionably were not. One was placed in the fill in room 33. The tops of the slabs which formed it were about 2 feet (60.96 cm.) below the top of the original wall and there was a distinct level of occupation 2 feet 6 inches (76.2 cm.) below it. (Pl. 7, *b*.) This was later abandoned and the remaining portion of the room filled in and a second story chamber erected over it. The pit in the corner formed by the circular and straight walls at the northeast side of kiva C was also covered by later refuse, so that it undoubtedly belonged to approximately the present stage in the growth of the pueblo. It had to be subsequent to the abandonment of that series of rooms and to precede by some time the final phase of occupancy, so it could hardly be considered as belonging to other than this horizon. The other two were in use until the final abandonment of the community. They may have been constructed during the stage of development at present under consideration, and for that reason have been indicated on the plan, or they may have pertained entirely to the following and final one. This could not be determined.

The ultimate development of the community was attained with the adding of the east and west wings; the construction of new chambers over the old abandoned 22, 26, 31, 32, and 33; the incorporating of inclosures in other portions of the building; and the placing of the four kivas in the earth in front of the structure. All together, 31 new rooms were erected, and the plan of the pueblo took on the form illustrated in Figure 4. There was no way of determining which of the two wings was built first, or, for that matter, if they had been constructed at the same time. There is no question concerning the inferiority of their architecture, if such it may be called. The ground plan shows clearly the irregularity of the rooms, and the masonry in the walls was much poorer than that in the older portions of the building. (Pl. 6, *b*.) As mentioned previously, the whole aspect of these portions of the dwelling suggests that a different group of people built them. It is quite possible that at this time the community was augmented by a group moving into the area and that the latter was invited to join the others. Such occurrences have been noted among the more recent Pueblo peoples and may well have taken place in the past. As will become apparent in the sections of this report which deal with the lesser objects from this site, there is distinct evidence of a strong Upper Gila element in the local culture. It is quite possible that this is to be attributed to the fact that peoples from that district actually penetrated into this section

and affiliated with the inhabitants of Chaco extraction. Under such conditions the cruder additions could well be ascribed to the newcomers. The walls certainly are very suggestive of those found in the ruins to the south. There is the possibility that the poorer construction might have resulted from a breakdown of the local culture, a thing which did and does happen, but such does not seem likely in this instance. The tremendous increase in the number of rooms, coupled with indications that many of the older chambers continued to be occupied, bespeaks a decided augmentation of the group, a growth which hardly could be accounted for on the basis of the natural increase in such a community.

The rooms comprising the east and west wings gave evidence of a certain progression in the order in which they were built. In the east wing room 11 was unquestionably the first to be erected. It was followed by 9, 10, and 8 in the order named. Then 7, 5, 3, 4, and 6 were built. The last in the series were those numbered 1 and 2 on the ground plan. Room 15 did not come into being until after the construction of kiva 2, as one corner of the room projected slightly over the pit. The wall had probably rested on the roof of the subterranean structure. A small court was formed between room 15 and the east end of the main building by the erection of a wall. An additional bit of construction consisted of a wall connecting the south side of room 10 with the corner of room 16. (Fig. 4.) The space between this and the old original east end of the pueblo was filled with refuse, stones, earth, and rubbish. It gave every indication of having been an intentional fill and not the result of a gradual accumulation. There was no evidence that the opening at the east end of the enclosure, lying between rooms 10 and 15 and along the edge of kiva 2, had ever been closed. Neither was there anything to suggest that the enclosure had ever been roofed over. It might easily have been covered and formed a compartment, but if such had been the case all evidence of it had disappeared. There was a stone-lined fire pit along the west wall which implied that a certain amount of household activity had taken place in the court.

The west wing was even more of a patchwork kind of house than the east one. The first rooms erected were 52 and 55, then came 57. It is possible that 53 may have preceded 57, but the matter is of no great importance since the two antedate 58, 56, and the enclosure numbered 54. Room 58 was built before 56 was erected and 54 was still later. The last two chambers at this end of the building were 59 and 60. Closely associated with construction at this end of the pueblo was the building of the terrace south of the west wing. (Fig. 4; pl. 1.) There was a decided slope to the original surface at this part of the site and the builders counteracted the disadvantage of having a sharply slanting dooryard by erecting a low wall

some distance south of the wing and then filling in with refuse and débris of various kinds. This was not an unusual practice on the part of the prehistoric Pueblo peoples and examples of such features are to be observed at various ruins throughout the area. It does not seem to have been peculiar to any one group or horizon and has no period or cultural significance.

Rooms 35 to 39 were placed in the space between the great kiva and the older chambers, 28, 29, and 34. There was no clue to the time when this was done, beyond the evidence that it took place subsequent to the construction of the latter. This was clearly shown by the comparatively thick deposit of refuse which had accumulated between the kiva wall and the west side of rooms 28 to 30 before the new chambers were erected. The section (fig. 4, *d*) made through this portion of the building illustrates the variation in floor and foundation levels between the two series. Rooms 35, 36, and 37 seem to have preceded 38 and 39 by a perceptible interval, as an additional amount of waste material was deposited there before the short wall separating the inclosure into two chambers was built. The four rooms, 36, 37, 38, and 39, are so small that they would have had very little value as living quarters. For this reason it is probable that they were used for storage purposes.

In this same section of the building three of the older rooms were abandoned, namely 23, 27, and 34. They had not been in service as long as some of the others but were vacated for a very good reason, one which seems to be closely associated with the construction of the upper chambers 32-A and 33-A. The south wall of the original room 33, later 32-33, had been pushed slightly outward in its upper courses and then had begun to buckle. Investigations indicated that this had resulted from the combined pressure of the refuse filling the ground-floor chambers, 32 and 33, and the weight of the upper rooms, 32-A and 33-A. In an effort to prevent the collapse of that part of the structure the occupants piled quantities of earth and rocks against the sagging wall and then completed the fill more gradually by depositing refuse in the remaining space. (Fig. 5.) The character of the material in room 34, especially, bore definite evidence that such had been the case. This is so well illustrated by the drawing that further comment is not necessary. There was one other feature, however, in connection with this activity which should be mentioned in passing. The doorway in the south wall of room 34 had to be blocked in order that the débris would not run out. The character of the masonry in this blocking and the mortar used between the stones suggested that the work had been done at the same time that room 35 was built. It is possible that the family which had lived in room 34 erected 35 when forced to vacate its previous quarters.

The fill in room 27 not only supported the weakened wall, which, however, was not so greatly damaged here as in room 34, but it completely blocked and covered over the ventilator to kiva B. Nothing was done to offset this disadvantage, apparently, and the ceremonial chamber continued to be used until the building was abandoned. That this had been the case was demonstrated by the fill in the chamber. There was no refuse in it; the material consisted wholly of débris of its own decay and stones from the fallen east wall of room 32-A.

There was little to be learned concerning the rooms which constituted the second story. A greater part of their walls had fallen, but sufficient evidence of their presence remained to demonstrate that such chambers had been erected. Although they had given the appearance of a second story to that portion of the building they can not, strictly speaking, be considered as such. The lower tier of rooms was no longer occupied, as a matter of fact did not exist, since they had been completely filled in with refuse. The three chambers 31-A, 32-A, and 33-A were built as a unit, then 22-26-A was erected. The tops of the walls of the old ground-level rooms served as foundations for the upper masonry. The latter did not rest entirely upon the former. In portions of the newer walls the stones projected beyond the original construction and were supported, in part, by the refuse content in the old chambers. This feature is clearly shown by the sections (fig. 4, *a*, *b*), and a more detailed discussion of it is not necessary. The fact that the pseudo second story had been built subsequent to the abandonment of the lower rooms was demonstrated by this overhang and by the unbroken floors which had been laid on the leveled-off top of the refuse deposit in them. The first three rooms, 31-A to 33-A, had walls of the same kind of masonry as that noted for the old section of the building, but the fourth contained the type characteristic of the east and west wings. Examples of this may be noted in Plates 7, *b*, and 8, *a*.

The construction of new apartments on top of abandoned, filled-in rooms was a frequent practice among the Pueblo peoples in pre-historic times and also is quite prevalent at the present. A large portion of the central section of Zuñi, that part of the village which seems to be perched on a hill, is built over vacated, débris-filled houses. As a matter of fact, both there and in some of the Hopi towns, the process which leads to such a condition is going on to-day in much the same fashion as it probably did in the past. Rooms are abandoned, the roofs are permitted to fall in, considerable sand is blown into the inclosure, and refuse is deposited there. As a result of erosive factors, portions of the walls collapse, and in a comparatively short time the chamber is practically filled with ac-



a. Corner of room 50 showing ventilator, deflector, and fire pit

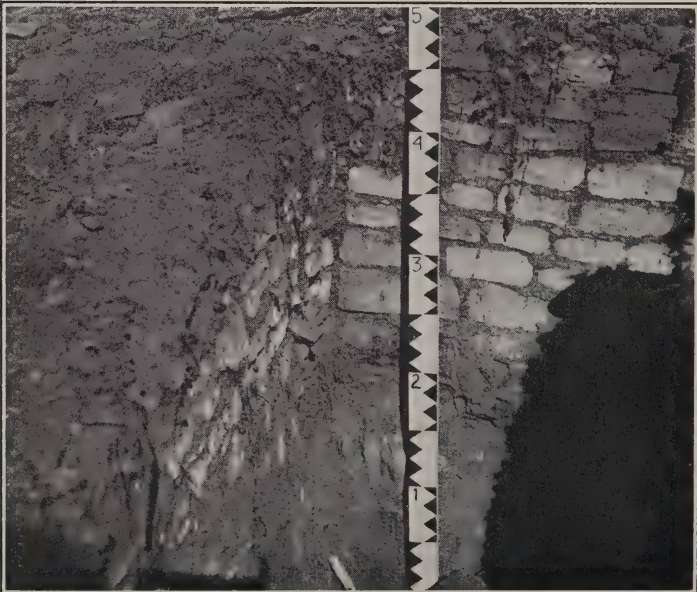


b. Fire pit on fill in room 33

DETAILS IN HOUSE A



a. Foundation of later rooms resting on top of earlier wall



b. Difference in foundation levels between old and later sections of building

CONSTRUCTIONAL FEATURES IN HOUSE A

cumulated material. Then some one decides to build a new house on the site. The remains of the ruined structure are leveled, and above them rises another dwelling. During the summer of 1930 a number of such operations were under way. In two instances the replaced structures had been vacated, fallen into decay, and become more than half filled with *débris* in a period of three years. The remaining bits of their walls were razed to the surface of the accumulation, and then the new construction started. In the completed rooms the floors were several feet above those of the old house.

Rooms 12 and 13 were very late in their construction. This was demonstrated by the height of their foundations above those of the back wall of kiva A. (Pl. 8, *b*.) Considerable *débris* had slipped down the talus slope and lodged against the north wall of the orig-

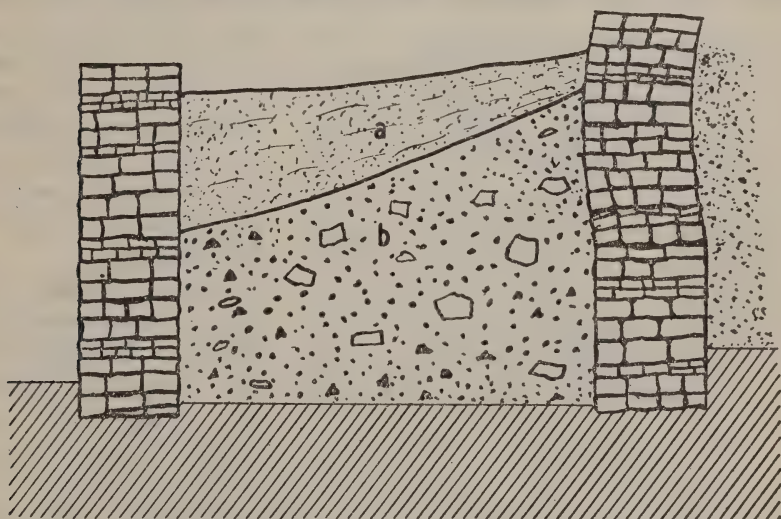


FIGURE 5.—Diagram of fill in room 33. *a*, Accumulations of ash; *b*, intentional fill to support sagging wall

inal structure. Possibly this was a part of the landslide which led the people to move from the section farther west, before the walls forming these inclosures were erected. As will be observed from the measuring rod in the photograph, the bottom of the wall of room 12, where it joined the back of the original building, was 2 feet 6 inches (76.2 cm.) higher than the one which it abutted.

There was little of special interest in the majority of the rooms erected during the last splurge of construction activity around this pueblo. Rooms 55 and 57 warrant some consideration, however. These two chambers were built around and over a large boulder which was too large to be moved out of the way. This is indicated on the ground plan and is also shown in the sections. (Figs. 3, *a*, and 4, *a*.) The wall separating the two rooms was built on top of

the stone. (Pl. 9, *a*.) The latter projected to a considerable degree into both chambers. In room 57 a mealing bin was constructed between the rock and the wall at the opposite side. The edge of the boulder served as the side of one of the compartments in the bin. (Pl. 9, *b*.) No metate was set in that compartment, and nothing indicated that one ever had been placed there. Consequently it is thought that it probably served as a storage place for unground grain or as a place in which to set jars or baskets holding meal. The plan of the room (fig. 4) shows three compartments in a row and a fourth at one side, a feature which provided one more stone than did the mealing bin in room 23. Only one of the original stones is in position in the bin in the photograph. The second stone was placed in position by one of the workmen after the room had been cleared. The three additional metates had been removed from the

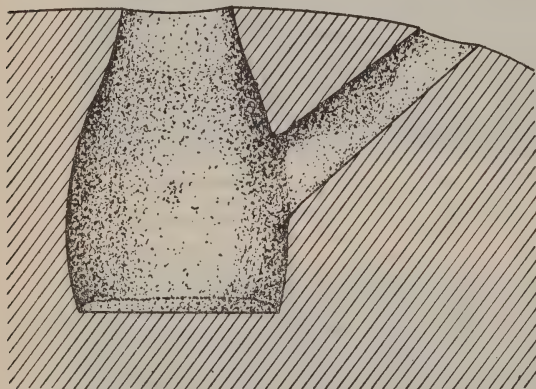


FIGURE 6.—Section through pi-gummi oven

bin before the room fell into ruin and was covered over. This was probably done by dwellers from another part of the building or possibly from one of the other houses.

Several outdoor fire pits seem to have been added to that phase of the community existence during the last stages of its develop-

ment. The location and position of these are shown on the plan (fig. 4), and the pits themselves call for little discussion. All were lined with stone slabs. Some were rectangular in outline, while others were roughly circular. There was one, however, which was not so much a fire pit as a pit oven. It was located on the slope some distance south of the east wing and on the plat of the ruins (pl. 1) is called a pit oven. In shape this pit was very suggestive of one of the large culinary vessels used during this period. The inside showed distinctly the marks of a digging stick used in making the excavation. Very hot fires had been kindled in it, because the whole interior was burned to a brick-red color. Perhaps the most interesting feature was the small vent or flue extending obliquely from one side of the pit to the ground level. (Fig. 6.) The walls of this tubelike opening were also burned until the earth had taken on a distinct reddish hue. Around the orifice, on the ground level, the hard-packed dirt was considerably blackened by smoke. A large, worked stone slab had been used as a cover for the main opening

into the pit. This object had been broken, but the fragments of it were found lying on the bottom of the pit. In all of its features, except that of size, this earth oven is very similar to the ones employed by the Hopi in baking sweet-corn mush wrapped in corn husks.⁷⁸ The latter have been described as follows by Mindeleff:

Each of the pi-gummi ovens . . . is provided with a tube-like orifice 3 or 4 inches [7.62 or 10.16 cm.] in diameter, descending obliquely from the ground level into the cavity. Through this opening the fire is arranged and kept in order, and in this respect it seems to be the counterpart of the smaller hole of the Zuñi dome-shaped ovens. When the principal opening, by which the vessel containing the pi-gummi or other articles is introduced, has been covered with a slab of stone and sealed with mud, the effect is similar to that of the dome-shaped oven when the ground opening or doorway is hermetically closed.⁷⁹

No one seems to have recorded such an oven for the Zuñi, and the workmen employed in the diggings said that they were not familiar with the type. It seems curious that the form was in the district in prehistoric times, and yet no traces of it are to be found among the Zuñi, while it is present in the Hopi country. There is the possibility that this kind of cooking pit was replaced by the dome-shaped oven of the present day soon after the arrival of the Spaniards, and that all remembrance of it has been obscured by the haze of uncertainty which envelops the past. Mindeleff long ago suggested that the complete adoption of a wholly foreign idea or feature of construction was not likely to be found among so conservative a people as the Pueblos and that the cooking pit developed to the point of the pi-gummi oven of the Hopi may well have been the stem upon which the Spanish type of oven was grafted.⁸⁰ More extensive work in the Zuñi region may show that such earth ovens prevailed in later stages than that represented by the present site and that the place which it occupied in the culinary customs of the people was taken by the dome-shaped ovens. The Zuñi continue to roast green corn, in the husks, in deep pits, but none of the latter have the oblique orifice at one side.

The oven near house A had been abandoned before the entire community was deserted, because the lower portion of it was filled with refuse and ordinary débris of accumulation, and a burial had been made in the upper part. The skeleton had reached an advanced stage of disintegration, due to the fact that the pit caught and held considerable moisture, but there was enough remaining to show that the individual had been an adult and that there had been no attempt at cremation. It was at first thought that the pit had been employed for such purposes, but this was not borne out by the evidence obtained. The mouth of this pit measured 1 foot 9 inches (53.34 cm.)

⁷⁸ Hough, W., 1915, p. 66.

⁷⁹ Mindeleff, V., 1891, p. 164. See fig. 53, p. 163. Hough gives the name pigame instead of pi-gummi.

⁸⁰ Mindeleff, V., 1891, p. 164.

in diameter. The sides sloped from this orifice to a point 2 feet 4 inches (71.12 cm.) below the opening, where the maximum diameter of 3 feet 4 inches (1.016 m.) was attained. At the bottom the pit measured 3 feet 3 inches (99.06 cm.) across. The total depth was 4 feet 9 inches (1.447 m.). The vent opening was 1 foot 7 inches (48.26 cm.) above the floor. It was oval in shape with an up-and-down diameter of 1 foot 3 inches (38.1 cm.) and a cross diameter of 9 inches (22.86 cm.). The tubelike tunnel narrowed near the outer end, where it measured 1 foot (30.48 cm.) by 8 inches (20.32 cm.). The vent orifice opened 2 feet 2 inches (66.04 cm.) from the edge of the mouth of the pit. The tapering of the flue suggested that it had been dug out from the inside of the pit rather than tunneled from the outside toward the oven.

One additional feature connected with the house A group should be considered before the kivas are described and discussed. At the base of the low cliffs east of the large building a series of inclosures, rather puzzling in character, was found. (Pl. 1, *A, B, C, D, E*.) It was difficult to determine whether the construction had been brought to completion or left in an unfinished state. Room A had unquestionably been occupied as a dwelling, but none of the other walls had been carried to a sufficient height to warrant the belief that the inclosures had been roofed over. The masonry extending from A to the base of the rocks, forming B, was only 3 feet (91.44 cm.) in height and gave no evidence of having had additional courses. There was no fallen wall material in the débris which filled the narrow space. Furthermore, the even tops of these walls suggested that there was no intention of adding to them. They did not present the usual appearance of unfinished masonry. On the contrary, inclosure C gave every evidence of not having been brought to completion. It seems quite apparent that it was the intention of the builders to add another chamber to A, but for some reason this was never carried out. D no doubt functioned as a court. E gave satisfactory indications that the masonry forming that inclosure had been erected as a retaining wall around a small refuse mound. The space was entirely filled with waste material from the dwelling and also contained two burials. It was at first thought that the refuse had been deposited in an abandoned chamber. When the investigation of that particular place had been concluded, however, there was no question but what the wall had been built around an already sizable accumulation of ashes, house sweepings, and other residue from the daily life of the community.

Room A in this group was of particular interest because of the fact that a large boulder formed one side of the chamber. The builders had taken advantage of this natural object and erected their

walls alongside of it in such fashion that it was necessary for them to construct only three sides of the room. The top of the stone was 5 feet 6 inches (1.676 m.) above the floor level. The highest part was on the room side, and the sharp slope of the upper surface would have effectively drained rain water away from the chamber. It is not generally supposed that the prehistoric Pueblos provided a pronounced slant to their roofs, but they did allow for a certain amount of drainage, and it is quite possible that in this particular case the tilt was toward the boulder, so that the water would follow a natural course and not drip down against the wall on the other side or tend to run into the room between the edge of the boulder and the ceiling.

The most satisfactory explanation for the long, narrow corridor designated B is that it may have functioned as a pen for keeping turkeys. There was plentiful evidence around the village that the people had had considerable numbers of such fowl, and the birds may on occasion have been confined in an inclosure of this kind. Beyond the fact that the skeleton of a turkey was found in it, the place itself gave no indication that it had functioned in that capacity. It was not filled with refuse, however, as was the case in E, and suggested that it had stood open until the time of the abandonment of the village. The *débris* in its interior was of the type which accumulates as a result of the action of natural forces. The walls were rather low to have functioned as an effective barrier, but sticks and brush placed across the top would have kept the birds from straying. Pens of this kind, stone walls, and brush tops, are not unknown among the present Pueblos, and may well have been employed in the past. Hence the suggestion in this instance.

The masonry in the walls of this cluster of inclosures was similar to that found in the east and west wings of the large dwelling. For this reason it is thought that they probably date from the same horizon in the development of the community and consequently were a late addition to the village.

KIVAS

One of the most interesting features associated with ruins is that of the ceremonial chambers, or kivas. As previously mentioned, there are two general types, one rectangular and the other circular. The circular group falls into two main divisions, the ordinary-sized chambers which are frequently called clan kivas and the super-ceremonial structures, or great kivas. The round form was the more highly specialized and reached its greatest development in the nuclear portion of the Pueblo area. In its spread to the more peripheral districts certain features were lost, although most of the essential characteristics were retained. The origin and growth of the small

or clan type of circular chamber has been fairly well determined, but there is still considerable to be learned about the rectangular examples. This may be attributed in no small degree to the paucity of work in sites where the latter was the predominant form. Future investigations should do much toward removing this condition, and it is possible that its development may be found to have paralleled that of the other form. It is only recently that considerable information necessary to an appreciation of the small circular type has been secured. Because there is so much labor involved in clearing one of these chambers of its accumulated débris, and because museum specimens are so rarely found in them, most of the earlier investigators did not excavate them. As a consequence, there are many districts where the house type is known, but data on the kiva are totally lacking. Since it has become recognized that knowledge is as essential as objects to be placed in an exhibition case, more attention has been devoted to the less productive phases, from the specimen standpoint. An example of this is the Little Colorado region. Until very recently it was glibly said that the circular kiva was missing from that area, but intensive investigations there have shown that such was not the case.

Southwestern archeologists long expressed the belief that the circular kivas, of the ordinary-sized group, represented a survival of the old original type of dwelling. The well-known tendency of primitive peoples to cling tenaciously to ancient practices in matters pertaining to religious observances furnished the basis for that conclusion.⁸¹ During the last few years examples of the ancient type of domiciles have been found in the remains of houses dating from Basket Maker III and Pueblo I times. These semisubterranean structures contained many of the features which later were incorporated in the kivas and definitely substantiate what for a considerable period was little more than theory.⁸² In the introduction to this paper it was pointed out that the development of the rectangular-roomed, above-ground houses created a problem, inasmuch as the religious ceremonies were probably inseparably associated with a round, semi-subterranean form of structure. In surmounting this difficulty it became the custom to provide one of the old-style chambers for each small-house group. When a number of these groups combined and built a single large dwelling several ceremonial structures were supplied.

The older, more primitive kivas show a closer resemblance to the pit houses than do the later highly specialized ones, but the derivation of the latter is still apparent. The earliest kivas were

⁸¹Mindeleff, V., 1891, pp. 111-112; Nordenskiöld, G., 1893, p. 168.

⁸²Roberts, F. H. H., jr., 1929 *ib.*, pp. 81-90; 1931, pp. 16-86.

detached from the main building. Their roofs were only sufficiently elevated above the ground level to provide for drainage and entrance was generally through a central opening in the roof, which served as a combined smoke hole and hatchway. Later the ceremonial chambers were attached to the dwelling and ultimately were brought above ground and incorporated into it. It was at this time that the practice of inclosing the kiva within a rectangular room developed. When this was done the space between the outer and inner walls was filled with earth, probably as a means of simulating an underground structure. Toward the end of the golden age of the house-building cultures, Pueblo III, there was a tendency to return to the practice of erecting the ceremonial chamber in a detached position. This is exemplified by the four kivas placed in the earth in front of house A. The revival of the older custom became quite marked in the subsequent horizons. The Hopi villages and some of those along the Rio Grande are present-day examples of the feature. At Zuñi, however, they still remain in the main mass of the dwellings. This condition did not prevail always. Many of the late prehistoric ruins of the Zuñi district have remains of kivas in the courtyards and in other instances they occupied more marginal positions. The oppressive policy of the Spanish authorities, and fear of the priests, at one time forced the people of this pueblo to hold their religious observances in secret in the innermost recesses of the ancient portion of the village. The original kivas were probably completely abandoned at this time and as a result of unfavorable conditions there was a general breakdown in the nature of the chamber. There is little structural evidence to differentiate the present kivas from ordinary large living rooms beyond the type of fire pit and hatchway entrance through the roof and, as Mindeleff has pointed out, it is doubtful whether these rooms represent the original form of kiva.⁸⁸

Characteristics common to most of the small circular kivas are: A banquette or bench; pilasters, columnar projections along the wall above the bench, which supported the roof timbers; a central fire pit; a deflector or screen; a ventilator consisting of a vertical flue and a horizontal passage opening into the room on or below the floor level; and storage boxes around the wall and in the floor. Quite a number of these structures have additional features in the form of a hole in the floor, near the center of the chamber, called the sipapu, and a deep niche or recess above the ventilator. These will be considered in more detail in the discussion of the kivas in house A. Not every kiva has all of the features listed above, but a majority of them are to be found in most of the structures. In gen-

⁸⁸ Mindeleff, V., 1891, p. 112.

eral it may be said that there were two types of kiva roofs; one was flat and the other was cribbed. The latter was the prevailing form in the northern districts.

The great kivas seem to have been a definite heritage from Basket Maker III times. A village dating from that period in the Chaco Canyon, N. Mex., contained one⁸⁴ and several have been found in sites of the same horizon in the La Plata district farther north. The developed form, as observed in later stages, contained more features than the earlier type, although basically it seems to have served the same purpose. Like the smaller chambers, the great kivas are circular in contour. Inside, the lower part of the wall is encircled by a bench; near the center of the floor is a fire pit, or a raised fire box; on either side there is a rectangular vault-like masonry box. Four large masonry pillars supported the central part of the roof. In the Basket Maker III examples large posts served in this capacity. Lying at a level considerably above that of the floor, at the north side of each great kiva, is a kind of antechamber. In some cases these were reached by means of built-in stairways; in others ladders were probably used. Most of the great kivas have a series of small rooms surrounding them. The floor levels of these chambers are on the same plane as that of the antechamber. The ground plan of several of these structures is very suggestive of a wheel. The kiva represents an enlarged hub and the walls connecting the periphery of the ceremonial chamber and the outer concentric wall, as well as furnishing the partitions for the surrounding rooms, constitute the spokes. The two great kivas at the present site did not have the series of peripheral chambers, but in each case the north antechamber was in evidence.

The function of these superceremonial chambers has not been determined. Morris has suggested that such structures were sanctuaries for the whole community, where the members of the various priesthoods met to perform rites as sacred as were known to the Pueblos of that time.⁸⁵ In the discussion of the large kiva found in the Basket Maker III village in the Chaco Canyon it was suggested that the smaller, more numerous ceremonial chambers were possibly dedicated to the performance of ordinary ceremonies peculiar to certain groups, the observances once held in the dwellings, whereas the great communal rituals, those in which all of the village was concerned, were held in the large structures, the superkivas.⁸⁶ It is quite possible, although the present knowledge on the subject does not justify a definite statement, that the dances now held in the more enclosed courtyards of the villages may once have been performed in

⁸⁴ Roberts, F. H. H., jr., 1929 *b*, pp. 73-81.

⁸⁵ Morris, E. H., 1921 *a*, p. 135.

⁸⁶ Roberts, F. H. H., jr., 1929 *b*, pp. 80-81.

the great kivas. Zuñi ceremonies which take place in an almost hidden plaza in the center of the main cluster of houses have frequently suggested such an idea.

The problem of the rectangular kivas, as already stated, is quite perplexing. Some investigators profess to see their development out of the rectangular form of pit house, in that way paralleling the origin and growth of the circular type. Such may well have been the case, but the explanation is not entirely satisfactory. In the region where the circular form had its origin and greatest growth rectangular pit dwellings were not uncommon and could as easily have furnished the prototype there as elsewhere. Something more significant than mere chance probably determined the choice. What that factor may have been is still to be determined. One plausible interpretation of conditions is that the rectangular form of dwelling was rather late in its appearance in the pit house horizon, Basket Maker III to be explicit, and for that reason had gained little ceremonial significance. Hence, the retention of the round type for religious purposes. The rectangular pit domicile may have predominated in the more peripheral sections as the result of a late spread of peoples and culture. On such grounds a room of similar shape for the ritualistic observances of later horizons would have been logical. One difficulty in this connection, however, is that the best examples of rectangular kivas, the Hopi and Zuñi, suggest a derivation from the circular form.

More than 40 years ago Cushing advanced the theory that the rectangular ceremonial rooms at Zuñi had evolved from the circular type. He explained it on the basis of the abandonment of the inner round structure inclosed in a rectangular room, the latter being retained and considered sufficient. In this connection he pointed out the fact that all of the ceremonies performed in the large square kivas at Zuñi were better adapted to a circular form of structure.⁸⁷ This would tend to indicate that they had grown up in the circular type and then had been transplanted without adaptation to a rectangular room. That the Hopi rectangular kivas might well have been derived from the round form is demonstrated by some of the earth chambers in front of house A at the site herein being considered. The flattening of three sides would readily produce such a structure. Inasmuch as indications at this time point toward a late origin for the rectangular kiva in the Kayenta and Hopi districts, as well as at Zuñi, it would seem that until further evidence is available the most logical conclusion would be that the rectangular form was derived from the circular type. This, however, may be vitiated by future discoveries.

⁸⁷ Cushing, F. H., 1896, p. 364.

There is one factor in connection with the foregoing discussion of rectangular kivas which should be made clear, and that is with respect to rooms 20 and 50. The latter are not considered as examples of rectangular kivas. It will be recalled that the suggestion was made that they possibly were the prototype of the fraternity chamber as contrasted with the true kiva. Whether this is a sound supposition or not only future investigations can tell. They can not be considered as examples of the rectangular form of ceremonial chamber, however. Several of the essential features of the latter are totally missing from those rooms, and so far as the present remains are concerned it seems best that they be regarded from the other point of view.

KIVA A

The most elaborate and the best preserved of the group of small kivas was that designated A in house A. It was found to contain many of the features which have been considered characteristic of the circular type, but in some respects it presented individual variations which served to set it apart from other chambers. The circular wall was erected inside a rectangular room, and except for one corner, where a small chamber, room 14, had been provided, the intervening space was filled with *débris*. (Fig. 7.) A portion of the northern arc was dug into the ground, so that the bottom of the room, from the bench top to the floor, at that side was subterranean. The major part of the structure was above that level, however, and an underground chamber was simulated by the fill. The desired effect had been obtained without extensive excavations having first been made. This was a consideration of no little importance when it is remembered that the only implements available for such work were stone and wood. The people of that period were unacquainted with any form of metal tools. When necessity or custom required, however, they did not hesitate to expend a great amount of energy in constructing such an edifice. The four subterranean dirt kivas and the great kivas are splendid examples in the present instance. There probably were other reasons than that of a saving of labor to account for the aboveground kivas built within a rectangular room. Although only conjectural, the most plausible explanation is that the custom developed as a part of the communal-house complex resulting from external pressure. Greater protection for its occupants would be provided by incorporating the ceremonial chamber in the main block of the building. Furthermore, it made possible a more compact and regular type of village structure. The kivas in house A were not likely placed in the dwelling as a direct result of such causes but in continuation of an already established vogue.



a. Wall built on top of boulder



b. Mealing bin in room 57

DETAILS IN HOUSE A



a. View of south side of chamber



b. North portion showing kachina niche

KIVA A

Typical kiva features found in A were a bench, a ventilator, deflector, central fire pit, sipapu, a deep recess or enlargement of the bench at the south side above the ventilator (pl. 10, *a*), and a small niche in the wall below the bench on the north side (pl. 10, *b*).

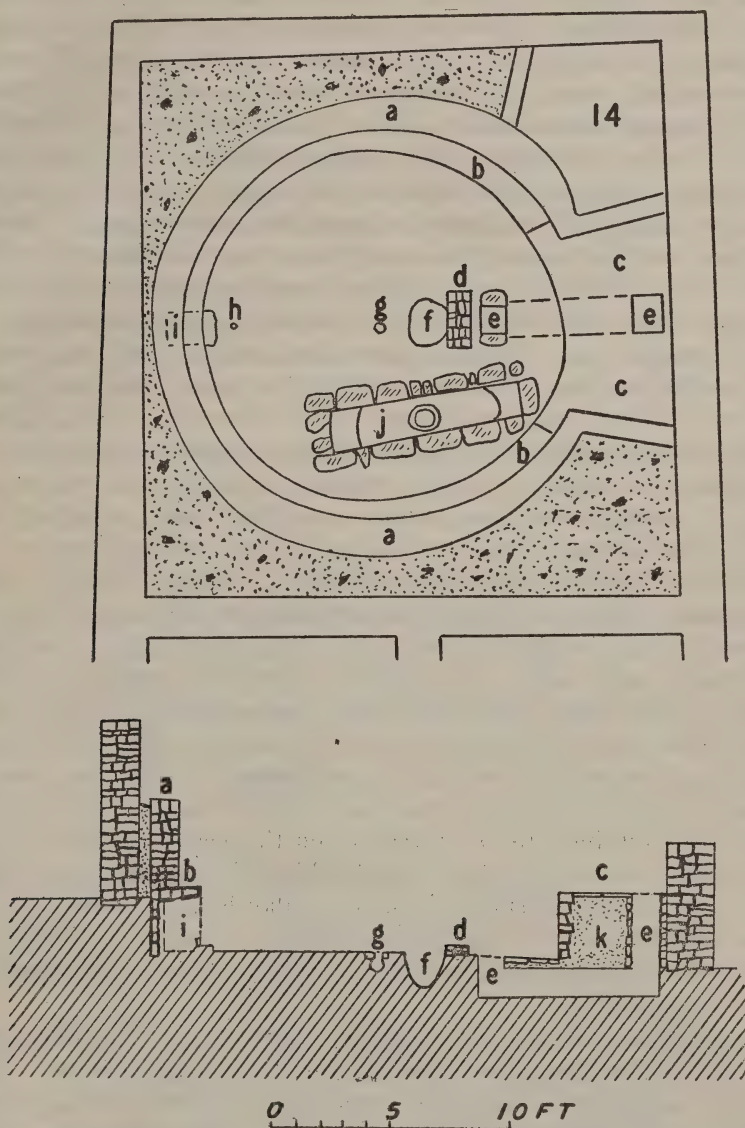


FIGURE 7.—Plan of kiva A. *a*, Outer wall; *b*, bench; *c*, ventilator recess; *d*, deflector; *e*, ventilator; *f*, fire pit; *g*, sipapu; *h*, hole for prayer stick; *i*, Katsina niche; *j*, subfloor vault; *k*, fill above ventilator passage

There were no pilasters to support the roof timbers, which suggests that a variation of the flat type of covering was used, and in the floor at the west side of the chamber was a long, rectangular

vault. (Fig. 7, *j*.) The lack of pilasters and the presence of a subfloor box are features which seem to be more or less characteristic in this general district. Benches without pilasters occur sporadically elsewhere, but the subfloor vault is rare in all but the Zuñi ruins.

One of the interesting features found in most kivas is the ventilator. The latter was just what its name implies; it served to supply the chamber with fresh air. As mentioned in the general discussion on ceremonial rooms, the ventilator usually consists of a vertical shaft opening to the outside and a horizontal passage extending from a vent in the kiva to the bottom of the flue. In some cases the passage penetrates the wall of the chamber, and the aperture is on the floor level; in others the horizontal portion passes beneath the floor, and the opening is in the floor at some distance from the wall. With a fire burning in the pit near the center of the room, the heat rising from it and passing out through the smoke hole in the roof would draw fresh air down through the shaft and tunnel and into the chamber. That such actually did occur has been demonstrated in kivas found with their roofs intact and also in those which have been restored. Evidence from a number of sources has shown that the feature was not designed originally for such a purpose. It unquestionably represents a modified and specialized survival of the entrance found in the earlier and cruder forms of pit houses, the Basket Maker III dwellings.⁸⁸ During Pueblo I times the tendency was to shift from the antechamber and passage type of entrance to the smoke hole-hatchway form, although the opening with tunnel and shaft at one side of the room was retained.⁸⁹ This would indicate that some significance was attached to the feature beyond that of a mere means of access to the domicile. Whether it was ceremonial or utilitarian or a combination of both is not known. It may be that certain rites were associated with the old doorway and it was retained for that reason, or the people may have discovered its value as a means of refreshing the air in the dwelling and on that basis continued it as a regular house feature. At all events it became a definite part of the kiva complex, although in later periods when the rectangular structures became prominent it finally disappeared.

The ventilator in kiva A was of the subfloor type. The horizontal passage had been dug below the general level of the chamber. The vertical shaft differed from the usual form in that it did not rise through the outer wall but was inside and opened in the floor of the recess above the ventilator passage. This is clearly shown by the section in Figure 7 and in the photograph, Plate 10, *a*. Why such an arrangement should have been made is not known. The ventilator

⁸⁸ Roberts, F. H. H., jr., 1929^b, pp. 84-85.

⁸⁹ Roberts, F. H. H., jr., 1931, pp. 23, 30-31, 39, 53, 62, 70, 75, 80-81, 84, 85, 110.

would certainly not have been as effective under such conditions as it would have been had the opening been to the outside air. This suggests that the feature may have been retained for strictly ceremonial rather than utilitarian purposes. That such was actually the case seems somewhat doubtful, however, as evidence in general tends to show that a practical function was the ultimate object in the construction of this kiva element. Had there been any remaining roof timbers over that portion of the chamber some explanation might have been forthcoming, but there was a total absence of superstructure débris with an attendant lack of helpful hints. It is possible that this kiva may have had a covering similar to that found in one structure in the Kayenta region by Doctor Fewkes. He reported that there was no roof over the recess in that chamber.⁹⁰ If the same condition had prevailed in kiva A, or if there had been a small opening in the recess covering, the ventilator would have functioned in a proper manner. All this, of course, is purely speculation. The only definite thing about the flue is that it opened into the recess.

The horizontal passage of the ventilator was dug into the earth and then covered over. A small offset along each side at the top of the trench supported the covering material. The latter consisted of small poles upon which rested twigs and leaves covered with a thin layer of earth. After the passage had been roofed in this fashion the wall of the bench was completed at the front of the recess, the sides of the vertical part of the ventilator were walled up, and the remaining space was filled in with earth. (Fig. 7, *k*.) The floor of the recess was paved with large stone slabs and that portion of the kiva completed. The masonry in the face of the bench at that point indicates definitely that it was erected after the completion of the trench. (Pl. 10, *a*.) Where the horizontal passage extended into the chamber, stone slabs, forming a bit of flagging in the floor, were placed on top of the brush and earth cover over the trench. The rectangular opening of the latter was equipped with a coping of stones.

The problem of the purpose of the deep recess above the ventilator is one which has as yet not been solved. One explanation is that it may be analogous to or represent the prototype of the spectator's bench or platform in the Hopi kivas.⁹¹ The latter occupies about one-third of the total floor space in the kiva, and its level is a foot (30.48 cm.) or more above that of the remaining portion. The Hopi say that this dais is free for the use of visitors or spectators just as the terraced housetops furnish points of vantage from which to

⁹⁰ Fewkes, J. W., 1911 *a*, p. 19.

⁹¹ Fewkes, J. W., 1911 *a*, p. 24.

observe dances held in the open courts.⁹² This idea may well have originated among the ancients and have survived down to the present day. In the kivas at Acoma the actual bench or recess is no longer present, but the spectators sit at the south end of the room where they will not interfere with the rites. An interesting fact in this connection is that although the kivas are now rectangular the spectators sit in a semicircle. This suggests that originally they squatted along the base of a curved wall. Ventilator recesses like that in kiva A have been considered one of the characteristics of the San Juan type of ceremonial chamber. The feature is especially prominent in Prudden's unit-type ruins;⁹³ it is found in some of the Mesa Verde kivas;⁹⁴ there are examples of it in the ruins at Aztec in northern New Mexico;⁹⁵ some of the circular chambers in the small houses of the Chaco Canyon region have it, and one kiva in Pueblo Bonito was built with a recess;⁹⁶ it occurs in northeastern Arizona;⁹⁷ and it has been found near the western borders of the Zuñi region.⁹⁸

The deflector, a structural element designed to prevent the air pouring into the chamber through the ventilator from blowing directly onto the fire, consisted of a low masonry wall in kiva A. It was placed between the ventilator opening and the fire pit. There was some space between the wall and the vent aperture, but it rose abruptly from the edge of the fire pit. (Fig. 7, *d*; pl. 10, *a*.) There was nothing unusual about this deflector, either in form or construction. In all respects it was quite like many other low walls built for a similar purpose. It might be said in passing that deflectors of various types are found. Some consist of a single slab of stone placed in an upright position between the fire pit and the ventilator; others are of wattle and daub construction, small upright poles incased in mud plaster; and there is the masonry group, of which the present is an example. The feature is a distinct survival from Basket Maker III and Pueblo I pit dwellings.⁹⁹ Many of the earlier investigators persisted in calling the deflector an altar and disregarded any utilitarian function which it might have had. The evidence gathered by persistent excavation has tended to show that the reverse was true. The utilitarian idea was foremost and the ceremonial probably of little consequence; in fact, it would be almost impossible to use the stone slab and wattle and daub forms of deflector as altars. The disappearance of the feature, with the

⁹² Mindeleff, V., 1891, pp. 121, 123.

⁹³ Prudden, T. M., 1914, fig. 4, p. 45.

⁹⁴ Fewkes, J. W., 1909 *a*, pl. 1; 1911 *b*, pl. 8.

⁹⁵ Morris, E. H., 1924, map.

⁹⁶ Pepper, G. H., 1920, pp. 220-221; fig. 155, room 59.

⁹⁷ Fewkes, J. W., 1911 *a*, pls. 13, 14; Kidder, A. V., 1924, fig. 12, p. 69.

⁹⁸ Roberts, F. H. H., jr., 1931, pl. 10, *c*.

⁹⁹ Roberts, F. H. H., jr., 1929 *b*, pp. 17, 20, 23, 26, 29, 32, 35, 43, 45, 50, 54, 63, 69; 1931, pp. 18-19.

abandonment of the ventilator, would also indicate a lack of any important ceremonial significance.

The fire pit in kiva A was roughly circular in outline. It had been dug into the earth and then lined with a heavy coating of adobe mud. The top was flush with the floor level, there was no encircling ridge, and at several places the rim had been strengthened by the introduction of small stones. There were not enough of the latter, however, to make a coping. The clay lining of the pit had been baked to a bricklike consistency by the fires which had been kindled there and no doubt had proved as satisfactory as the more substantial stone facing frequently found on the sides of such basins. Although the pit was comparatively deep, it had not been used in its entirety. The lower portion had been filled with clean sand before any fires were started. This seems to have been a rather common practice in the Pueblo area, but its significance is not known.

A short distance from the edge of the fire pit, and lying to the north of it, was a hole in the floor which is called the sipapu (also known by the names shipapulima, shipapuyana, cibobe, and chipap). There are a number of explanations for this feature, probably due to the fact that in the Indian mind it is endowed with a variety of attributes. Among the present-day Pueblos it is regarded as the place of the gods and the most sacred portion of the ceremonial room. In addition, it symbolizes the opening through which the people first emerged when coming up from the under to the outer world and the aperture through which their spirits must return when they go to join their ancestors. Also, through this hole comes the beneficent influence of the deities. There seems little question but what it had the same significance among the prehistoric Pueblos.

The example in kiva A showed careful workmanship and a somewhat more elaborate character than is usually observed. A well-smoothed block of sandstone with a circular perforation through its center was placed over the hole in the floor. The top of this block of stone was flush with the general floor level. There was a cover for the opening, consisting of a circular piece of specially prepared slate. (Pls. 10, *a*; 12, *a*.) It was found in place when that portion of the kiva was uncovered during the process of excavation. The treatment of the sipapu varied considerably. Some consist of simple holes in the floor with a lining of adobe plaster. Others were fitted with a neck from a broken jar. Some of the present Zuñi kivas have a stone with a hole through it embedded in the floor and among the Hopi the general practice is to cover the hole in the floor with a plank, the top of which is flush with the floor, through which an opening has been cut. When not in use, the hole is kept plugged or covered with a board or stone. The presence of a cover in kiva A shows that the latter custom is not a recent innovation. At the

bottom of the sipapu in kiva A were several very small stone beads, made from a ferruginous shale, and two pieces of turquoise. The latter was in the rough matrix. According to the Zuñi, offerings are always placed in the sipapu. Turquoise, because of its marked religious significance, is especially appropriate and it is practically mandatory that pieces of it be deposited there. The other items may vary. This is particularly true in the kind of beads used. They may be shell or bone as well as stone. At Zuñi, however, shell is the preferred form for the sipapu offerings.

One of the most interesting features in kiva A was that of the long subfloor vault or trench at the west side of the chamber, between the fire pit, deflector, ventilator group, and the wall. (Fig. 7, *j*.) As mentioned previously, vaults of this type are not common in kivas

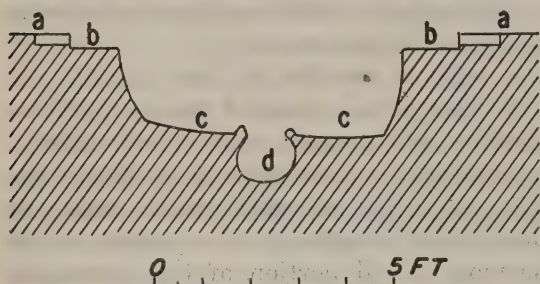


FIGURE 8.—Section through subfloor vault of kiva A.
a, Floor level; b, platforms; c, bottom of vault; d, basin in vault floor

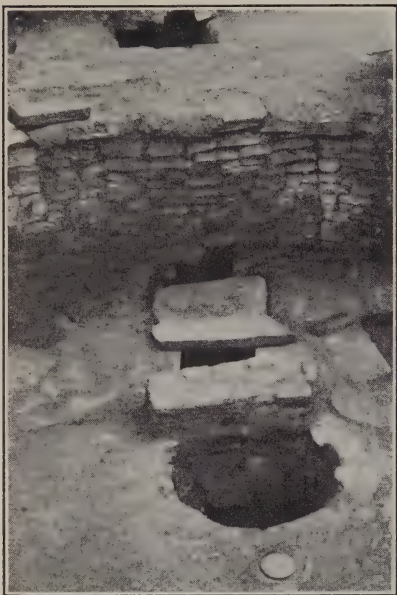
in general. They form one of the characteristic elements in the great or super kivas, but outside of the Zuñi region are rarely found in the ordinary type of ceremonial chamber. The two circular kivas which Hodge excavated near Hawikuh contained similar vaults¹ and one of the ceremonial chambers in the ruin on the Long H Ranch in eastern Arizona presented a comparable although slightly different form of the feature.² The variation in the Long H vault was one of location. It was placed between the fire pit and the sipapu, its long axis running east and west, instead of at one side of the chamber on a north-and-south line. The vault in kiva A was dug into the earth. It had two main levels. At each end, a few inches below the floor, was a small platform; the sides of the pit then descended sharply to the bottom. Near the center of the vault floor was an oval opening bordered by a rim of adobe plaster. Below this aperture was a small jug-shaped basin. (Fig. 8.) The upper borders of the vault were framed by a series of thin stones set into the floor. The tops of these stones were smooth and placed flush with the floor. This coping constituted the only use of that material in the vault. The earth walls and bottom, as well as the inside of the floor basin, were covered with adobe plaster. All of the details of this vault are clearly illustrated in Plate 11 and need no additional elaboration.

¹ Hodge, F. W., 1923, pp. 15, 23-24, 35-37.

² Roberts, F. H. H., jr., 1931, p. 98.



SUBFLOOR VAULT IN KIVA A



a. Sipapu, fire pit, ventila'or complex in A



b. Kacina niche showing imprints of prayer sticks



c. Kiva C showing subfloor vault, fire pit, and ventilators

KIVA FEATURES

The purpose of the subfloor vaults in the great kivas has long proved a stumbling block for archeologists endeavoring to explain the features found in those structures. For a time it seemed that the discovery of similar elements in some of the smaller ceremonial chambers would only add to the difficulty. Recently, however, certain factors associated with the performance of ceremonies in the kivas at Acoma have become known and as a result it is possible to suggest an explanation for the presence of the vaults in the small chambers. In the kivas at Acoma there is a rectangular pit in the floor at the north side of the fire pit. In the bottom of this rectangular cavity there is a hole which is held to be symbolic of the aperture through which it is believed the great ancestral mother of the group passed on the journey which led her to the present world. When ceremonies are being performed in the kiva certain of the priests dance on the board covers of the pit in order that a deep booming sound essential to the proper observance of the rites may be produced.³ In other words the pits might properly be considered as a form of built-in drum. The vault in kiva A may have fulfilled such a function. The slightly depressed levels or shelf-like features at each end would have made it possible to place roughly hewn planks over the deeper portion of the pit without breaking the floor line, since the lower position of the rests would compensate for the thickness of the covering. There was no indication in the vault that it had been covered, but if timbers had been used in that capacity all traces of them might easily have been obliterated by decay. One of the vaults in the kivas near Hawikuh gave evidence of a stone lid.⁴ Whether the latter would have functioned properly as a sounding board or have withstood the pounding feet of an energetic priest is debatable. It is conceivable, however, that it might have proven satisfactory. The preparation of wooden planks would have been a rather difficult and tedious job for people equipped only with stone implements, although they were not incapable of producing objects of that nature, as examples from the Mesa Verde, Chaco Canyon, and other localities have demonstrated.

There may be a possible connection between the dancing on the cover over the pit in the Acoma kivas and a similar practice observed among the Hopi. At certain intervals during the progress of a ceremony the latter stamp on the board in which the sipapu is cut. The explanation given for this action is that they wish to inform those in the spirit world that a ritual is being performed so that they may join in it and add their supplications to those of the living. The

³ This information was obtained from unpublished notes kindly furnished by M. W. Stirling, Chief of the Bureau of American Ethnology. Mr. Stirling's informant was Edward Hunt, an Acoma Indian, who spent the summer and fall of 1928 in Washington.

⁴ Hodge, F. W., 1923, p. 15.

question arises as to whether this represents a breakdown in custom and the transfer of ceremonial practice from one kiva feature to another or a ritualistic development along somewhat different lines. Where some of the ancients provided a separate and distinct element on which to enact parts of their rites the later peoples may have been content to let one serve both purposes. On the other hand, this special feature may have been a late development in one relatively small group of people and have had neither a very wide distribution nor a lasting influence on the rituals. Still another interpretation is that the Acoma pit and Hopi sipapu rites are truly analogous and have no bearing whatsoever on the function of the kiva vaults. It should be borne in mind that the foregoing has been in the nature of speculation and suggestion in an effort to explain the significance of the subfloor vaults. Thus far no archeological evidence on their function has been secured.

Incorporated in the bench at the north side of kiva A was a niche of more elaborate form than is usually found. (Pl. 10, *b*.) A stone slab, carefully worked, had been placed on edge at the bottom of the opening to form a sill for the aperture. Immediately in front, on the floor of the kiva, was a broad, low step of adobe mortar. The sides of the opening did not rise vertically but slanted slightly so that the top was narrower than the bottom. Originally a stone lintel had extended across the top and provided an unbroken surface for the bench. This had fallen, however, and was not in position when the kiva was excavated. It was in the débris which filled the front portion of the niche. Imprints in the plaster showed where it had rested. Smaller niches are frequently found at this side of kivas, but construction as extensive as that in kiva A is rather rare. The Hopi kivas of the present day have them and they also form a feature in the Acoma chambers. Among the Hopi they are called the *Katcina kihu* or house of the *Katcinas*. During ceremonies certain masks are placed in them when not in use by the dancers.⁵ The Acoma explanation is that such niches represent the door of the northern, eastern, and western mountains, of the Sun and the Moon. When prayers are offered up to the deities of those regions the supplication is made into that opening. Also, when the spirits of the gods enter or leave the kiva they do so through the same "doorway." Similar niches are often found at other sides of the ceremonial chamber, but they are not considered as important as that at the north and serve only as repositories for minor objects, such as bits of paints, pipes, and small implements.

The niche in kiva A seemed to have been more in the nature of a shrine or altar. When its interior was being cleaned out it was

⁵ Mindeleff, V., 1891, p. 121.

found that a greater part of the space had been filled with sticks. The latter had been set in an upright position, their tops leaning toward the back wall. Unfortunately, the material had all decayed and it was not possible to obtain a single stick. The molds left in the blow sand which had drifted in around them before they disintegrated were so distinct, however, that there could be no question about their former existence. (Pl. 12, *b*.) In several of the molds meager traces of decomposed wood still adhered to the sides. The question arose as to what the sticks might have been. Minute observation of the earth and the impressions in it revealed occasional faint outlines which could have been made only by feathers. Hence there seemed little doubt but that the sticks had been prayer pahos which had almost completely filled the niche at the time when the kiva was abandoned. They may have been special offerings deposited there instead of at shrines removed from the village. It is possible that the same idea prevailed there as at Acoma, namely, that the gods could be reached through that opening and that gifts to them properly belonged there. Measurements of the molds showed that the sticks had averaged 2 feet (60.96 cm.) in length and one-fourth inch (6.35 mm.) in diameter. The altar or shrine aspect of this niche was enhanced by the fact that in front of the adobe step there was a small hole in the floor which the Zuñi insisted was to hold a wand or prayer stick. Close by, on the floor of the kiva, were two stones of the type called tiponi, or corn goddess symbols. They were not standing in the positions shown in the photograph (pl. 10, *b*), but were tipped over on their sides. They were lying in such a way, however, as to suggest that they had been placed as shown. The Zuñi workmen insisted that they should be so set, although the only explanation they could give was that similar stone objects were usually put at each side of the altar. Objects of this kind have been found in ruins in other sections. Several examples were secured at the Mesa Verde and a number have been observed at various sites in the Little Colorado or Hopi region. Zuñi informants stated that even at the present time one is occasionally placed in a cornfield in order that a plentiful crop may be assured. When employed in this way the stones are usually ornamented with beads and feathers and are sprinkled, from time to time, with sacred pollen.

Kiva A contained other fetishes in addition to the tiponi just discussed. The finding of a head cut from stone was quite unexpected. Some kind of animal is represented by the carving, but, although the work was carefully done, it is not possible to determine definitely what it was intended to depict. Whether it was supposed to be an actual or a mythological creature can not be stated. This object will

be considered in greater detail in the section of this report dealing with the products of the people's handicraft, hence a more complete description is not essential here. Another object which probably served some fetishistic purpose was found on top of the bench above the north niche. It is a purely natural formation, a curiously shaped concretion which caught the fancy of some Indian and was carried to the kiva. Similar stones have frequently been found in ruins and are to be observed in the ritualistic paraphernalia of the modern Pueblos. They are considered as symbolic of the germ of life.

Kiva A measured 16 feet 6 inches (5.029 m.) above the bench on its east-west diameter and 14 feet 9 inches (4.495 m.) below the bench on the same line. On the north-south diameter it was 20 feet 8 inches (6.299 m.) from wall to wall above the bench, this measurement including the ventilator recess, and 15 feet 2 inches (4.622 m.) inside the bench. The recess was 9 feet (2.743 m.) along its south wall and 7 feet 3 inches (2.209 m.) where it opened into the kiva. From the front of the recess, the edge of the bench, to the south wall was 4 feet 7 inches (1.397 m.). The floor of the recess was 5 inches (12.7 cm.) higher than the top of the bench. The bench averaged 10 inches (25.4 cm.) in width. At the north side of the chamber its top was 2 feet 8 inches (81.28 cm.) above the floor. Because of the difference in level between the top of the bench and the floor of the ventilator recess on the south side, the wall of the bench rose 3 feet 1 inch (93.98 cm.) above the floor of the room.

The mouth of the ventilator flue, where it opened in the floor of the recess, measured 1 foot 3 inches (38.1 cm.) on the north-south line and 1 foot 6 inches (45.72 cm.) on the east-west. From the mouth of the flue to the bottom of the shaft was 4 feet 5 inches (1.346 m.). The end of the horizontal passage was 1 foot 2 inches (35.56 cm.) high where it joined the shaft. The total length of the horizontal passage, not including the shaft, was 6 feet 5 inches (1.955 m.). The opening in the floor was practically square. It measured 1 foot 2 inches (35.56 cm.) on the east-west line and 1 foot 1 inch (33.02 cm.) on the north and south. At the vent end the passage was 1 foot 1 inch (33.02 cm.) high. At the outer or shaft end of the tunnel it had a width of 1 foot 7 inches (48.26 cm.), while at the inner end it was 1 foot 6 inches (45.72 cm.).

The deflector wall was 1 foot 6 inches (45.72 cm.) wide and 2 feet 5 inches (73.66 cm.) long. Its top was 6 inches (15.24 cm.) above the floor. From the edge of the ventilator opening to the bottom of the deflector wall was a distance of 5 inches (12.7 cm.). The fire pit wall at the deflector side seemed a continuation of the latter, inasmuch as there was no measurable distance between the two. The masonry rose abruptly from the pit edge.

The fire pit was roughly oval in contour with an east-west diameter of 2 feet (60.96 cm.) and a north-south measurement of 1 foot 6½ inches (46.99 cm.). The bottom of the pit was 1 foot 6 inches (45.72 cm.) below the floor level.

The sipapu was 1 foot (30.48 cm.) from the north edge of the fire pit. The hole in the stone had a diameter of 2¾ inches (6.032 cm.). The cavity in the floor was larger. It had a diameter of 3¾ inches (9.525 cm.) and a depth of 10 inches (25.4 cm.). The block of stone in which the sipapu hole was cut measured 6¼ by 6¾ inches (15.875 by 17.145 cm.). It was 1¾ inches (4.445 cm.) thick. The slate cover for the sipapu was 5 inches (12.7 cm.) in diameter and had an average thickness of three-eighths inch (9.525 mm.).

The rectangular subfloor vault had a total length of 8 feet 1 inch (2.463 m.). The shelf at the north end was 1 foot 1 inch (33.02 cm.) long and that at the south end was 1 foot (30.48 cm.). The smaller, deeper portion of the pit was 6 feet 1 inch (1.854 m.) long at the top and 5 feet (1.524 m.) at the bottom. The vault was 1 foot 5 inches (43.18 cm.) wide at the south end and 1 foot 9 inches (53.34 cm.) across at the north end. The floor of the south shelf was 4 inches (10.16 cm.) below the top and that at the north end 3½ inches (8.89 cm.) lower than the floor of the chamber. The bottom of the pit was 2 feet 1 inch (63.5 cm.) below the floor at the south end of the vault and 1 foot 9 inches (53.34 cm.) at the north. The rim around the juglike hole at the center of the bottom of the vault was 3 feet 8 inches (1.117 m.) from the south end of the inner pit and 3 feet 9 inches (1.143 m.) from the north end. The rim was 3 inches (7.62 cm.) from the west wall of the pit, while it was 5 inches (12.7 cm.) to the east. The rim averaged 3 inches (7.62 cm.) in width and 3 inches (7.62 cm.) in height. The bottom of the basin was 1 foot (30.48 cm.) below the floor of the pit. Including the rim it had a total depth of 1 foot 3 inches (38.1 cm.). The aperture to the basin had a north-south axis 9 inches (22.86 cm.) long. The east-west diameter was 7 inches (17.78 cm.).

The hole in the floor in front of the niche at the north side of the chamber had a diameter of 1½ inches (3.81 cm.) and a depth of 4 inches (10.16 cm.). From the north edge of the hole to the adobe step in front of the niche measured 8 inches (20.32 cm.). The step was 1 foot 5 inches (43.18 cm.) long, 6 inches (15.24 cm.) wide, and 3 inches (7.62 cm.) high. The top of the stone sill in the aperture was 3 inches (7.62 cm.) above the tread of the adobe step. The opening into the niche was 1 foot 2½ inches (36.83 cm.) wide at the bottom and 1 foot (30.48 cm.) at the top. From the top of the stone sill to the floor of the niche was 6 inches (15.24 cm.). When the lintel over the opening had been in place the aperture had a

height of 1 foot 8 inches (50.8 cm.). The niche extended back into the wall 1 foot 6 inches (45.72 cm.). The ceiling of the niche sloped slightly downward, and while the total height just inside the aperture was 2 feet 3 inches (68.58 cm.), at the back it was only 2 feet 1 inch (63.5 cm.).

The outer wall of the kiva, the curved masonry, averaged 1 foot 4 inches (40.64 cm.) in thickness. The sides of the ventilator recess were not so massive and were only 10 inches (25.4 cm.) thick. The kiva wall was 1 foot 9 inches (53.34 cm.) from the west side of the inclosing rectangular chamber, 5 inches (12.7 cm.) from its north side, and 1 foot 10 inches (55.88 cm.) from the east. At the south side the wall of the rectangular room also constituted the wall of the recess.

KIVA B

The simplest of the three ceremonial structures incorporated in the main mass of the building in house A was kiva B. This was the chamber which was built in the inclosure which had previously been occupied by two secular rooms. Practically the only feature which suggested that this had been intended for a ceremonial place was its roughly oval form. It did not have a bench, there was no sipapu, and no Katcina niche at the north side. It did have a rectangular fire pit near the center of the room and adjacent to the pit a rectangular depression in the floor. There was a ventilator, but, as already mentioned in the discussion of house A, it was not like the ventilators in the other kivas. It consisted only of a small opening in the wall between the kiva and one of the adjacent rooms. As a matter of fact, the entire aspect of kiva B was that of a makeshift or temporary ceremonial place. All of the evidence obtained from it, however, indicated that it was occupied down to the time when the building was abandoned and that it had had considerable use. In view of this, its severity and lack of characteristic features must be explained on other grounds. The most logical interpretation would seem to be that it was merely a lounging room for the men of that particular group. No ceremonies of any significance could be held there, inasmuch as one of the most important factors, the sipapu, was missing.

Among the present-day Pueblos the kiva serves as a temple for the performance of sacred rites; it is also the council chamber where public affairs are discussed; it is used as a workshop by the industrious and as a lounging place by those who have nothing to do. Many of the older boys and men sleep there when conditions at home are not conducive to the desired repose. This does not seem always to have been the case, however. Mindeleff in his work found that originally there were two kinds of kivas, one devoted wholly to the purposes of a ceremonial chamber, the other not specially conse-

crated and intended for more general uses. Now one room apparently is sufficient for all purposes.⁶ On this basis kiva B can well be considered an example of the second type. In this connection attention should be called to the suggestion, previously made, that kiva B probably was constructed to replace C after the west end of house A had been menaced by the landslide which impinged against its rear wall. Kiva C also lacked a sipapu, the presence of which possibly distinguished such chambers as were considered specially consecrated to religious functions, which would indicate that it, too, had served a general purpose.

Practically the only features of particular interest in kiva B were those dealing with the actual construction of the chamber. Its ground or floor plan was exceedingly simple. (Fig. 9.)

When the two rooms were remodeled into the one oval chamber it was necessary to remove the central partition to provide for a larger inclosure and to take out parts of the side walls in order that the curved masonry

could be erected. All but the lowest course of the central wall was razed. It was left in position and the floor filled in with refuse until level with the tops of the remaining wall stones, then a new surface of adobe was spread and a new occupation level provided. Preparations for the two pits, *a* and *b*, Figure 9, were probably made before the final coating of mud plaster was laid. The fire pit, *a*, was dug through the old floor and into the native earth below it. In order to do this it was necessary to remove a few of the foundation stones of the old wall. This was not done for pit *b*, however,

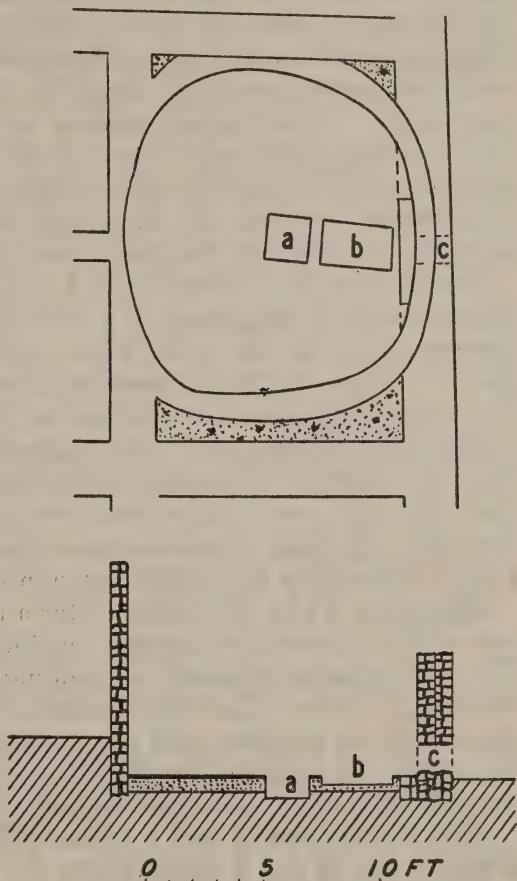


FIGURE 9.—Plan of kiva B. *a*, Fire pit; *b*, ladder pit; *c*, ventilator

⁶ Mindeleff, V., 1891, pp. 130-132.

since it was so shallow that its bottom was on the line of the tops of the foundation stones. Portions of the north and south walls were also removed and curved masonry substituted, but no attempt was made to alter the east and west sides of the original chamber. At the east end the new construction was built against the old and at the west an entirely new wall was erected, and the space between it and the old one was filled with *débris*. Material from the south wall was taken out as far down as the new floor level, and the original masonry could be observed extending across the room in front of the curved construction. This was not apparent at the north side. A portion of the wall along the latter margin of the chamber was so reduced in thickness by the remodeling process that the security of the kiva was somewhat endangered. No misfortune befell the structure, however, as was evidenced by the fact that it was still standing.

The purpose of the second pit, *b*, is not known. In its general characteristics of size, shape, and location it suggested a similar depression found in one of the kivas in the pueblo on the Long H Ranch, 42 miles (67.592 k.) southwest from Zuñi.⁷ Some of the pit dwellings of the Pueblo I horizon at the same location contained a comparable feature, and it was suggested that they probably were the place where the lower end of the entrance ladder rested.⁸ Some such provision would have been necessary to prevent the ladder from slipping on the smooth surface of the floor. No better explanation is forthcoming for the depression in kiva B.

After kiva B had been occupied for a time the room to the south into which the ventilator opened was filled with rubbish and *débris*. This was an accompaniment of building and remodeling activities around the village. The abandonment of the neighboring room and the loss of the ventilator had no apparent effect on the use of kiva B, a fact which suggests that the feature was not of sufficient significance to warrant or cause the vacating of the chamber.

Kiva B measured 12 feet 4 inches (3.759 m.) on its north-south diameter and 13 feet 6 inches (4.114 m.) on the east-and-west line. The fire pit was almost a square, measuring 1 foot 10 inches (55.88 cm.) on one side and 1 foot 11 inches (58.42 cm.) on the other. It had a depth of 11 inches (27.94 cm.). The second pit, the one which it was suggested served as a ladder rest, was 6 inches (15.24 cm.) from the fire pit. It was a decided rectangle in form. On a north-south line it measured 3 feet (91.44 cm.) and on the east and west 1 foot 10 inches (55.88 cm.). The average depth of the depression was 3 inches (7.62 cm.). The ventilator opening was 1 foot 2 inches (35.56 cm.) wide, 1 foot 1 inch (33.02 cm.) high, and 1 foot 6 inches (45.72 cm.) long.

⁷ Roberts, F. H. H., jr., 1931, p. 100.

⁸ Roberts, F. H. H., jr., 1931, pp. 20-21.

KIVA C

The third ceremonial chamber in house A bore many points of similarity to the first one described. It was more complete than B, but not quite as well finished as A. The latter condition may not have been true at the time of occupancy but may have resulted from the fact that it had been abandoned, allowed to fall into disrepair, and then used as a dumping place for refuse. The approximately circular wall was erected within a rectangular room, as was observed in A. A greater part of the lower portion of C was dug into the earth than had been the case in A. Almost the entire northern half of the chamber, from the top of the bench to the floor, was below the ground level. As a matter of fact, the paving which constituted the upper surface of the bench was laid directly on the original ground. Along the southern side of the kiva it had been necessary to build up the bench somewhat because of the natural slope of the ground, but even so the floor was still lower than the old surface. The space between the upper walls, the curved and straight masonry, was filled in with débris. There was no corner chamber in this structure, such as room 14 next to kiva A. An occasional example of a room of that kind is found, but on the whole little advantage was taken of the opportunity for small inclosures which the method of construction made available. The interior features in kiva C were not so numerous as those in A. It had a narrow bench, a ventilator, a recess at the south side above the ventilator, a fire pit, a subfloor vault, and a Katsina niche. There were no traces of a deflector, and, as previously mentioned, there was no sipapu. (Fig. 10.) In its lack of pilasters the kiva was consistent with other examples found in this district.

The ventilator in kiva C was rather complicated in that it was of double construction. Instead of a single horizontal passage leading into the chamber there were two. One was of the form more frequently found in the north, it penetrated the wall and opened directly into the chamber, and the other was of the type noted for kiva A. (Fig. 10, section; pl. 12, *c*.) Both horizontal passages connected with the same vertical shaft or flue at their outer ends. The flue was different from that in A. It rose inside the wall and opened to the outer air. This is the form generally observed in the various ceremonial structures. The subfloor passage had been similar to that in A. It consisted of a trench dug into the earth below the floor level. The trench had been covered with poles, sticks, earth, and plaster. Originally the vent in the floor had been framed with stones, but most of the latter were missing. The upper part of the recess and the second ventilator were constructed after the subfloor passage had been completed. In providing for the second tunnel and

the recess the builders erected masonry walls to form the sides of the passage and to complete the face of the kiva bench. The tunnel part of the ventilator was covered with stone slabs, poles, brush, and plaster until a tight ceiling was obtained. Then the space bounded

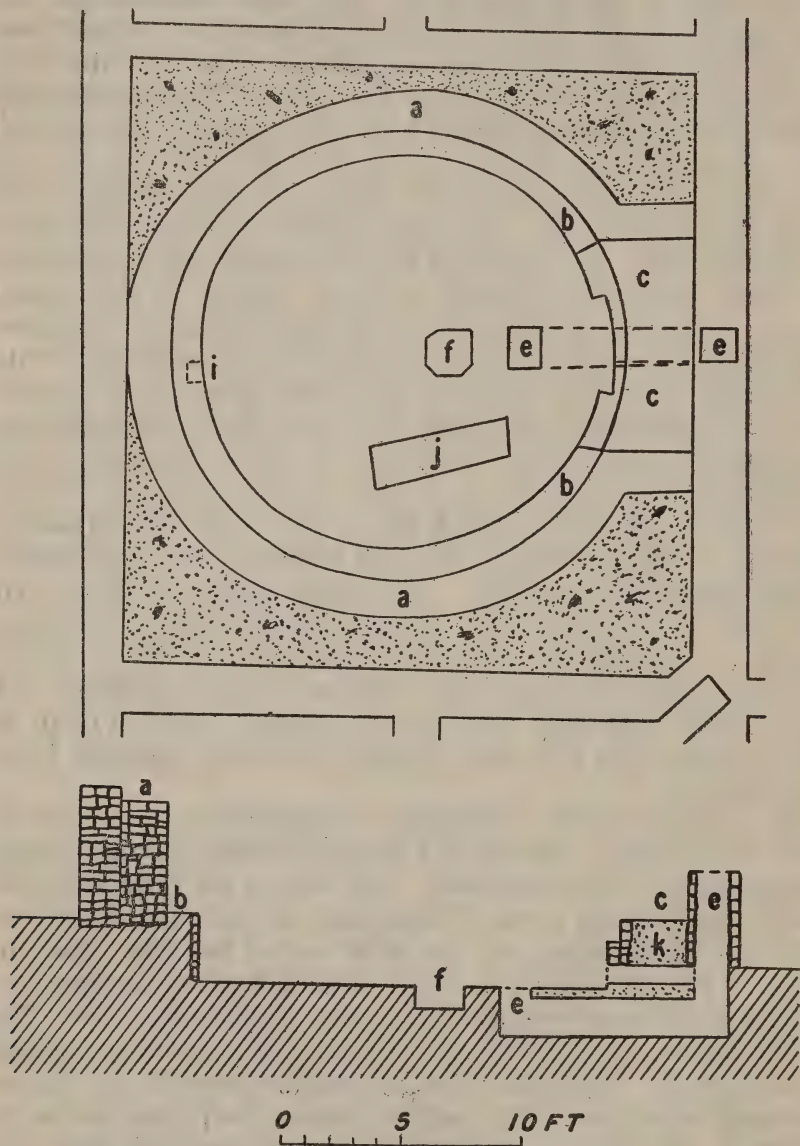


FIGURE 10.—Kiva C. *a*, Outer walls; *b*, bench; *c*, ventilator recess; *e*, ventilator; *f*, fire pit; *i*, Katsina niche; *j*, subfloor vault; *k*, fill above ventilator passage

by the walls of the recess and the bench wall was filled in to the desired level and the recess floor laid down. One curious feature in connection with the aperture of the second or upper ventilator was that the lintel, which was of stone, was laid at a decided angle.

(Pl. 12, *c.*) It seems rather curious that the builders were so careless in that respect when most of the masonry showed that an effort had been made to make it fairly even.

The recess in kiva C was slightly different from that in A. The plan did not suggest a keystone shape quite as much as was the case in the other kiva. This was due to the fact that there was not much variation between the length of the back wall and that of the opening into the chamber. A more noticeable feature, however, was observed at the front of the recess. The floor of the latter was higher than the bench, just as in kiva A, but it did not extend to the edge of the bench. Instead it terminated on a line with the kiva walls, and its front edge was curved to correspond to the curve in the face of the bench. Furthermore, the segment of bench in front of the recess had a higher level than that around the remainder of the chamber, so that there was a distinct shelf or ledge extending across the ventilator. In addition, the face of the bench was slightly recessed in the region of the upper ventilator aperture. Why this should have been done is not known. A similar treatment has been observed in other kivas, but thus far its significance has never been satisfactorily determined. Figure 10 illustrates the features just discussed, and it will not be necessary to go into further details about them. Attention is called to them because they show some of the differences between kivas A and C.

There was little of importance to be observed in the fire pit in this kiva. It was neither circular nor rectangular, but an irregular septagon in its contour. It had been dug into the earth and possibly may have been intended for a circular pit. When the coping of stones around its upper rim was laid the blocks used were of such dimensions that they produced the outline indicated on the plan. The lower part of the pit had plastered walls. No stones were used in the lining below the coping.

The subfloor vault at the west side of the chamber (fig. 10, *j*) differed from the one described for kiva A. It did not have the shelf-like features at either end. The pit dropped directly from the floor level. In addition, there was no small depression or hole in the bottom near the center. The sides of the pit differed from those in A in that they were of masonry construction. The flooring of the kiva was laid to the edges of the vault, and no coping of stones showed, although the pit walls were lined to the floor level. One rather curious feature about the pit was that its length was practically the same as that of the inner, deeper portion of the vault in A. Also, there was no marked variation in the width of the two. Whether this was due to a coincidence or had some definite significance is not known. It would seem that the important part of the vault was the deeper portion and for that reason would tend to a

certain regularity in size, but there is no evidence to substantiate such an idea. The lack of the shelf-like part of the vault may have had a bearing on the nature of the kiva. Hodge found at Hawikuh that one of the vaults had the feature while the other did not.⁹ Curiously enough, there was the same relation in those structures with respect to the type of vault and presence or absence of the sipapu as was found in kivas A and C. The vault with the shelf-like ends in both instances was in the kiva containing a sipapu, while the simpler form was in the chamber without a representation of the symbolical place of emergence. All that can be done at the present is to call attention to the combination of features. Further investigations are necessary before any definite conclusions can be drawn on the significance of the occurrences, although it might be suggested that there may have been some connection between them and the intended functions of the particular kivas. The essentially ritualistic chamber probably would have had them in their most complete form, while the kiva devoted to more general usage would not.

The Katcina niche at the north side of kiva C was more like those customarily found in such structures. It was only a small, boxlike recess in the face of the bench. It was considerably above the floor level and only large enough to hold a few very small objects. When the accumulated sand and refuse was cleared from it there was nothing to indicate what might have been placed there. No objects were present in the fill.

Kiva C measured 18 feet 9 inches (5.715 m.) on its east-west diameter above the bench and 16 feet 3 inches (4.953 m.) on the same line inside the bench. The north-south diameter, including the recess, was 21 feet 9 inches (6.629 m.). On the same line it was 18 feet 11 inches (5.765 m.) from the north wall to the edge of the recess floor above the ventilator. This would correspond with the above-bench measurement on the east-west diameter. Inside the bench the north-south line of kiva C was 17 feet 3 inches (5.257 m.). The recess was 8 feet 10 inches (2.692 m.) along its south wall and 8 feet 9 inches (2.667 m.) where it opened into the kiva. The west wall of the recess was 3 feet 9 inches (1.143 m.) long and the east measured 4 feet (1.219 m.). Through the center of the recess, from the edge of the floor to the back wall, was 2 feet 10 inches (86.36 cm.). The difference between this measurement and that of the side walls was due to the curve in the edge of the flooring. The floor of the recess was 4 inches (10.16 cm.) higher than the ledge above the ventilator opening, and the top of the ledge was 5 inches (12.7 cm.) higher than that of the bench. The bench ranged from 10 inches (24.5 cm.) to 1 foot 5 inches

⁹ Hodge, F. W., 1923, pp. 15, 23-24; Pls. V, XII.

(43.18 cm.) in width. At the north side of the chamber its top was 2 feet 10 inches (86.36 cm.) above the floor of the room. At the south side the bench top was 2 feet (60.96 cm.) above the floor, the raised segment over the ventilator was 2 feet 5 inches (73.66 cm.) above that level, and the floor of the recess was at the same height as the bench top on the north side, namely, 2 feet 10 inches (86.36 cm.).

The ventilator flue in the outer wall measured 1 foot 4 inches (40.64 cm.) by 1 foot 6 inches (45.72 cm.). From the mouth of the flue to the bottom of the shaft was 7 feet (2.133 m.). This measurement is not as great as it was when the building was occupied, since it does not include the upper portion of the wall which had fallen. The end of the upper horizontal passage, where it opened into the shaft, was 8 inches (20.32 cm.) high and 1 foot 4 inches (40.64 cm.) wide. The passage had a length of 3 feet 7 inches (1.092 m.). The aperture at the kiva end was 1 foot 4 inches (40.64 cm.) high on the east side and 1 foot (30.48 cm.) on the west. It was 1 foot 6 inches (45.72 cm.) wide at the bottom and 1 foot 2 inches (35.56 cm.) at the top. The lower ventilator passage opening was 1 foot 6 inches (45.72 cm.) high where it opened into the flue and 1 foot 4 inches (40.64 cm.) wide. Its total length from the point where it entered the flue to its inner end beneath the horizontal vent in the kiva floor was 8 feet 2 inches (2.489 m.). At the vent end the passage was 1 foot 8 inches (50.8 cm.) high and 1 foot 8 inches (50.8 cm.) wide. The opening in the floor of the kiva measured 1 foot 8 inches (50.8 cm.) on an east-west line and 1 foot 4 inches (40.64 cm.) from north to south.

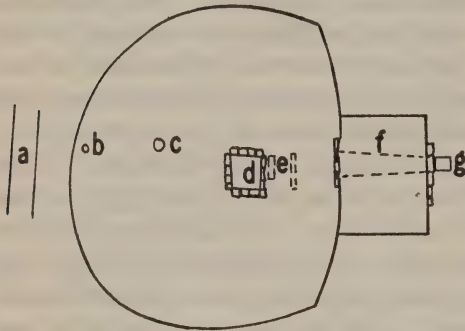
The fire pit was 1 foot 6 inches (45.72 cm.) from the ventilator opening in the floor. On a line through the center of the pit it measured 1 foot 11 inches (58.42 cm.) from the north edge to the south. A similar line from east to west showed the same distance, 1 foot 11 inches (58.42 cm.). The pit had a depth of 1 foot (30.48 cm.).

The rectangular vault at the west side of the chamber had a total length of 5 feet 9 inches (1.752 m.). It was 1 foot 7 inches (48.26 cm.) wide at the south end and 1 foot 9 inches (53.34 cm.) wide at the north. It had an average depth of 2 feet 6 inches (76.2 cm.). The vault was 3 feet (91.44 cm.) from the face of the bench at its south end, 2 feet 10 inches (86.36 cm.) from the bench at the center of its west side, and 4 feet 2 inches (1.27 m.) distant from the wall at its north end.

The Katcina niche in the face of the bench at the north side of the chamber was 7 inches (17.78 cm.) wide, 8 inches (20.32 cm.) high, and 9 inches (22.86 cm.) deep. It was 6 inches (15.24 cm.) below the top of the bench and 1 foot 8 inches (50.8 cm.) above the floor of the kiva.

The outer wall of the kiva, the curved masonry, averaged 1 foot 7 inches (48.26 cm.) in thickness. The sides of the ventilator recess, in contrast to those in kiva A, were approximately as thick as the walls of the chamber. The east-recess wall was 1 foot 5 inches (43.18 cm.) thick, a little less than the average for the kiva, while the one at the west side had a thickness of 1 foot 8 inches (50.8 cm.). The kiva wall was 2 feet 2 inches (66.04 cm.) from the west straight wall of the rectangular room, touched that at the north side, and was only 11 inches (27.94 cm.) from the east wall. The

south wall of the rectangular inclosing room also formed the back wall of the recess.



KIVA 1

The subterranean or dirt kivas, so called because very little stone was employed in their construction, were much simpler in form than the masonry examples incorporated in the dwelling structure. Their interior features were not as numerous or elaborate as those described for kivas A and C. Kiva 1 was the largest of the group of four ceremonial chambers of this type. The major portion of this kiva consisted of a D-shaped, rather than circular or oval, pit which had been

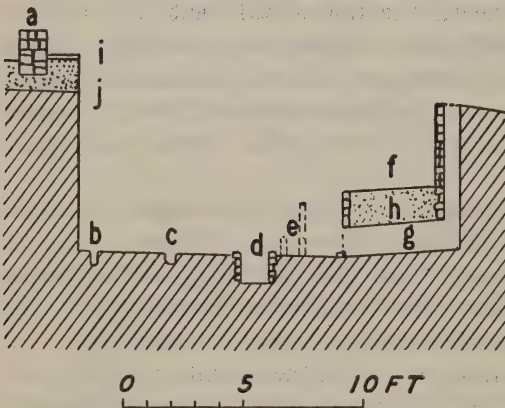


FIGURE 11.—Kiva No. 1. *a*, Wall of room 4; *b*, hole in floor; *c*, sipapu; *d*, fire pit; *e*, deflector stones; *f*, ventilator niche; *g*, ventilator opening; *h*, fill above ventilator passage; *i*, present ground level; *j*, original level

dug in the earth in front of the east wing of house A. There was no bench. Except at the south side, where there was a characteristic recess, the walls of the chamber rose from the floor to the ceiling without a break. The room was equipped with a ventilator, two deflectors, a fire pit, a sipapu, and one additional hole in the floor at the north side. There were no other features. (Fig. 11.)

The recess above the ventilator was comparable in form to those described for the masonry kivas A and C. It differed from the latter, however, in that it was dug into the earth instead of being

built up. When the builders made the excavation for this structure they provided for the recess by removing a rectangular block of earth at that side of the pit. Closely associated with these efforts were those directed toward the preparation of the ventilator. When the recess had been dug to its proper level a trench was cut in its floor to provide for the horizontal passage of the ventilator, and the vertical shaft or flue was made in the face of the south wall. The horizontal passage was then roofed over, at the desired height, with poles, brush, and earth. The latter fill was sufficient to restore the floor level of the recess. A short masonry wall was erected in front of the cut in the rear wall of the recess and the vertical shaft thus completed. The floor of the recess was paved with large stone slabs and the side and back walls covered with a coating of adobe plaster.

The most interesting feature connected with the ventilator was its aperture at the chamber end of the horizontal passage. A large sandstone slab had been cut in the shape of a horseshoe and set into the wall to form the opening. (Pl. 13, *a*.) The edges of the stone showed careful rubbing and smoothing and there is no doubt but what a considerable amount of time and energy was spent in preparing it for use. An opening of this type is rare in the kivas of the Southwest. It certainly stands unique, thus far, for the Zuñi district. Perforated stone slabs have been found at other localities, especially in the Little Colorado area, but no horseshoe-shaped stone has been reported in kiva ventilator construction. Fewkes suggested that some of the perforated slabs may have been built into the walls of rooms to partially close the passageway. The majority of those which he found, however, were placed over graves. Because of that fact the explanation offered was that the hole was for the escape of the soul or breath-body.¹⁰ Hough reported finding perforated slabs which had been used as tops on fire pits. These were observed in the Milky Hollow district east of the Petrified Forest in Arizona.¹¹ An expedition from Colorado College in the summer of 1927 uncovered similar ovens in the region south of Navajo, Ariz. This section lies to the north of Hough's Milky Hollow district, but it is a part of the same general cultural division. The slabs from the Navajo sites were of two varieties. One was rectangular with a large circular hole through the center. The other was an annular stone.¹² Hodge found an example of the latter during his excavations in the pre-Hawikuh site where the circular kivas, previously men-

¹⁰ Fewkes, J. W., 1904, pp. 106, 160-162.

¹¹ Hough, W., 1903, p. 320.

¹² Information on these stones and photographs of them were furnished to the writer by W. W. Postlethwaite, Director of the Colorado College Museum at Colorado Springs, who had charge of the university's expedition.

tioned, were uncovered. The stone at that place had been in position over a fire pit in a dwelling room. He also obtained a similar specimen from one of the earlier Hawikuh dwellings.¹³ The stone in the ventilator of kiva 1 might have been prepared from a broken ring of the Navajo-Hawikuh annular type, or such an object may have suggested the use of such a frame for the vent opening. The same general technique would have been required to produce the vent stone as would have been employed in manufacturing one of the oven slabs. Hence it would seem that there was some basic connection between the objects, although their usage was decidedly different. There was nothing about the site to indicate that the people of this community had made or employed oven covers of either the rectangular or annular forms. Consequently, knowledge of such stonework must have been obtained elsewhere.

The vent stone was set in such a way that there was no question but what the builders of kiva 1 had carefully prepared the opening to receive it. A low platform of horizontally laid stones was provided for the base and sill of the aperture. A slight offset was made at the sides of the trench which had been dug for the horizontal passage and the vent stone fitted in flush with the wall of the kiva. It was secured by the use of adobe plaster. Above the top of the vent stone the end of the trench was closed with a bit of masonry which rose to the level of the recess floor. (Pl. 13, *a*.) The upper part of the ventilator trench, above the pole-and-brush ceiling over the tunnel, was then filled in with débris and the floor of the recess paved. A portion of one of the large slabs used for that purpose rested on top of the masonry above the vent, showing that the flagging had not been laid down until after the completion of the passage.

The deflector in kiva 1 had consisted of a large stone slab set in the floor in an upright position between the ventilator opening and the fire pit. A second smaller stone stood practically on the edge of the fire pit between the latter and the deflector stone. This second slab did not constitute an auxiliary deflector, strictly speaking, but probably was so placed to protect the lower end of the ladder, used in entering and leaving the chamber, from the heat and flames of the fire. The use of two stones in this fashion was not uncommon in kivas and examples of it have even been found in some of the subterranean houses of the Pueblo I period. The stones were not in position when the pit was cleared of its accumulated débris. They were lying on the floor where they had fallen after the abandonment of the structure. The places where they had stood were clearly indicated by grooves in the floor. The largest of the stones, the

¹³ Hodge, F. W., 1923, pl. XVI; p. 26.

deflector slab, is shown in the photograph of the ventilator opening. (Pl. 13, *a*.) It is leaning against the wall to the right of the measuring rod.

The fire pit in kiva 1 differed from all the others found in the ceremonial chambers in that it was lined with stone masonry. After the pit had been dug into the floor its sides were lined with small, regularly shaped stones laid in adobe mortar. The usual practice in lining such pits was to use larger slabs and to stand them on end. The people seldom took pains to make a regular wall. The sipapu consisted of a simple hole in the floor. Its sides were carefully plastered, but there was no coping or cover. The second hole in the floor was of the same type. It was not as large as the sipapu and could hardly have been intended for storage purposes. A few personal trinkets might have been kept in it, although it is doubtful that it was for that usage. The best explanation for it is that it corresponded to the hole in front of the north niche in kiva A and may have been the place where a ceremonial staff was placed.

The problem of the time relation between kiva 1 and the dwelling structure presented difficulties. In the discussion of house A it was stated that the dirt kivas probably belonged to the last phase of occupancy in the village. The evidence for this belief was not as conclusive as could be desired but it pointed, nevertheless, to a late constructional activity. Kiva 1 was dug after the site had been lived on for a period sufficient to allow a considerable accumulation of refuse about the dwelling. That the excavation had penetrated this deposit was shown by the fact that a portion of the north wall consisted of such material. The adobe plaster which had covered the sides of the pit not only overlay the natural earth walls but it continued above the line of the old original surface and coated the face of the man-deposited stratum as well. Furthermore, there was a distinct break in the nature of the fill along the kiva wall. Had the refuse accumulated after the kiva was built, occupied, and abandoned it would have extended across the pit and not stopped abruptly at the edges of the hole. Associated with this was the evidence for the late erection of the east wing of the stone building. The latter, as was brought out in the discussion of that feature, was built on an accumulation of refuse. There was a still further deposition of such material along the south wall of the east wing before the kiva pit was dug. This was demonstrated by a definite surface of occupation some distance below the top of the deposit along the wall and also by the fact that the ground level was much higher than that of the floors of the rooms. It is possible, of course, that the people could have excavated an area large enough to include the east wing and thus provide a lower floor level. Such was not likely to have been

the case, however. On the other hand, the refuse material could have been blown against the side of the building after it had been vacated and thus raise the ground level. The wind could hardly have dug a pit which exactly coincided with the sides of the kiva and then have plastered its walls. Hence there seems little question but what the kiva was later than the east wing. Since the latter has been shown to have been subsequent to the main block of the original structure, kiva 1 undoubtedly belongs to the last stage of occupancy in the village.

Kiva 1 measured 13 feet 5 inches (4.089 m.) on its east-west diameter. From the north wall to the edge of the ventilator recess was 10 feet 11 inches (3.327 m.). The total north-south measurement, including the recess, was 14 feet 11 inches (4.546 m.). The recess measured 4 feet 11 inches (1.498 m.) along its south wall. The opening into the kiva was the same. The east wall was 3 feet 7 inches (1.092 m.) long and the west measured 3 feet 10 inches (1.168 m.). The floor of the vent recess was 2 feet 9 inches (83.82 cm.) above the floor of the chamber.

The ventilator shaft was 7 by 10 inches (17.78 by 25.4 cm.) and had a total depth of 6 feet (1.828 m.). It is possible that the kiva wall had been higher on that side and that the depth of the shaft was proportionately great, but weathering conditions may have eroded away the upper portions of both. The horizontal passage was 8 inches (20.32 cm.) wide and 1 foot 3 inches (38.1 cm.) high at the shaft end. From the shaft to the opening into the chamber measured 4 feet 3 inches (1.295 m.). The passage widened considerably at the aperture end and measured 1 foot (30.48 cm.) from wall to wall. Its height remained the same, 1 foot 3 inches (38.1 cm.). The stone base and sill for the aperture stone was 3 inches (7.62 cm.) higher than the floor of the passage. The vent stone had a height of 1 foot 5 inches (43.18 cm.) and a maximum breadth of 1 foot 9 inches (53.34 cm.). The aperture cut in the stone was 1 foot 1 inch (33.02 cm.) high and 11 inches (27.94 cm.) wide at the maximum portion of the opening. The stone was 1½ inches (3.81 cm.) thick. The combination base and sill projected into the room 3 inches (7.62 cm.). It was 2 feet (60.96 cm.) long and its top was 3 inches (7.62 cm.) above the floor level.

The deflector stone stood 1 foot 6 inches (45.72 cm.) from the ventilator opening. The stone was 2 feet 3 inches (68.58 cm.) high, 1 foot 6 inches (45.72 cm.) wide, and 1½ inches (3.81 cm.) thick. The second and smaller stone was 8 inches (20.32 cm.) from the deflector. The stone was 11 inches (27.94 cm.) high, 1 foot (30.48 cm.) across, and 2 inches (5.08 cm.) thick. From the edge of this stone to the inside edge of the fire pit was 4 inches (10.16 cm.).

The fire pit measured 1 foot 3 inches (38.1 cm.) on its east side, 1 foot 2 inches (35.56 cm.) on the west, 1 foot 3 inches (38.1 cm.) on the south, and 1 foot 5 inches (43.18 cm.) on the north. The average depth was 1 foot 3 inches (38.1 cm.). The sipapu was 2 feet 9 inches (83.82 cm.) from the edge of the fire pit. The hole was 5 inches (12.7 cm.) in diameter and 6 inches (15.24 cm.) deep. The second hole in the floor was the same distance from the sipapu that the latter was from the fire pit, 2 feet 9 inches (83.82 cm.). Whether this could have had any significance is not known. The second hole was 3 inches (7.62 cm.) in diameter and 8 inches (20.32 cm.) deep. It was 3 inches (7.62 cm.) from the wall.

At the north side of the chamber the wall of the kiva rose 8 feet 2 inches (2.489 m.) above the floor. The old ground surface was 6 feet 6 inches (1.981 m.) above that level. The refuse deposit rose 1 foot 8 inches (50.8 cm.) above the original top of the ground.

KIVA 2

The second of the subterranean dirt kivas differed from the other ceremonial structures in that it had no recess above the ventilator at the south side of the chamber. The pit approximated the D-shape. As in kiva 1, there was a marked flattening of the south wall. Why this should have been done is not known. It is rather curious that all four of the underground chambers should exhibit that tendency when none of those inside the building did. In this connection it would be well to call attention to the fact that a number of the pit houses of the Pueblo I period on the Long H Ranch, southwest of Zuñi, were characterized by a similar flattening at the ventilator side of the room. In addition, two of the kivas in the pueblo ruin at the same location had the D-form.¹⁴ In view of those conditions it is possible that some local developments in the Zuñi region were responsible for the form. The excavation for kiva 2 differed from that for kiva 1, as well as from the other two chambers, in that the walls were not vertical. They curved slightly from top to bottom, so that the room had a greater diameter at the floor level than at the top. This may have been accidental or it is possible that the builders had definite reasons for digging such a pit. Inasmuch as the other kivas did not show a similar treatment it seems likely that it was purely fortuitous.

Interior features were few and simple. There were only the ventilator, deflector, fire pit, sipapu, and a Katcina niche. (Fig. 12.) The ventilator was dug as a trench, the shaft walled up, the passage covered over, the break in the wall of the room closed with masonry, and the intervening space (fig. 12, *f*) filled with débris. The upper

¹⁴ Roberts, F. H. H., jr., 1931, figs. 11, 12.

end of the flue or shaft was framed with a coping of stones. The inner end of the horizontal passage had an aperture framed with stones. There was a stone sill and two rectangular blocks of the same material served as jambs and supported the lintel, also of stone. The deflector was a single stone slab set upright in the floor between the vent opening and the fire pit. The latter was dug into the floor and on three sides was lined with adobe plaster. The fourth, that toward the deflector, was faced with a stone. This may have been done to reinforce that edge and prevent its crumbling as a result of the pressure of the ladder at that side. The sipapu was a mere hole

in the floor, although its sides were plastered. The Katcina niche consisted of a small circular hole in the wall some distance above the floor. It had been dug into the earth and its walls finished off with a coating of mud plaster.

The most interesting feature in kiva 2, and one which was unique in the ceremonial structures of this village, was the decorations on the wall. The latter were geometric in character and had been placed at intervals around the chamber.

Only fragments of the patterns remained, but

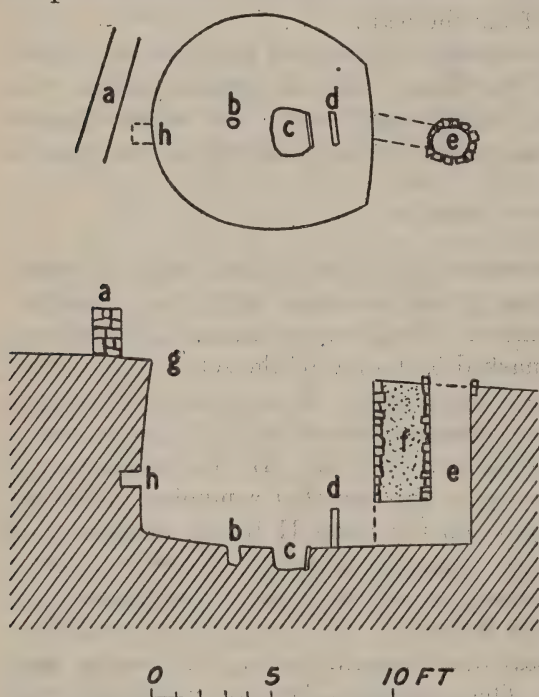
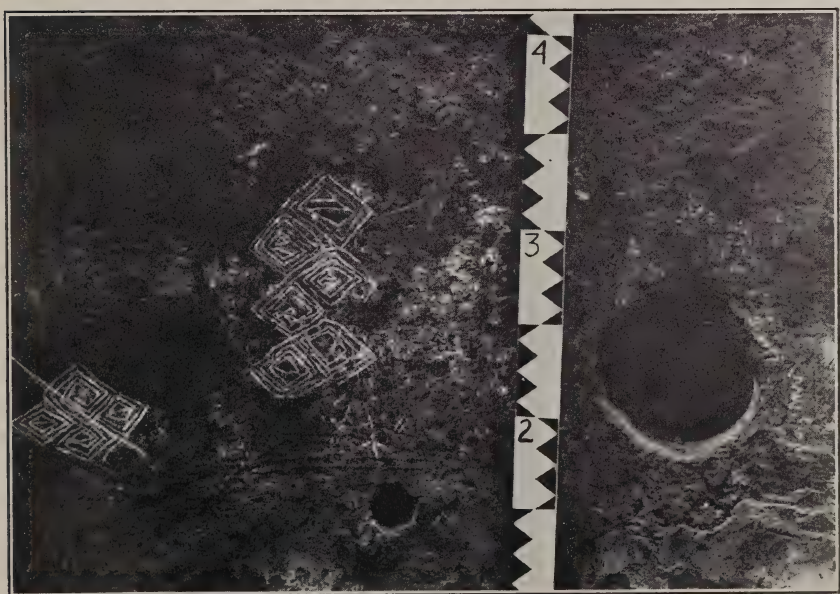


FIGURE 12.—Kiva No. 2. *a*, Wall of room 8; *b*, sipapu; *c*, fire pit; *d*, deflector; *e*, ventilator; *f*, fill above ventilator passage; *g*, ground level; *h*, Katcina niche

there was sufficient to show what the nature of the designs had been. (Pls. 13, *b*; 14, *a*.) Indications were that there had been alternating panels, one vertical, the next horizontal, and so on around the kiva. The same figure furnished the main element in each of the panels. There were one or two decorations, however, which differed. At the right side of the Katcina niche (pl. 13, *b*) was a squiggled line. Near it was a centipede-like symbol, only a portion of which is shown in the photograph. Just above the left center of the second picture (pl. 14, *a*) a small section of checkerboard design can faintly be seen. This was the only bit of decoration of that type which could be found on the wall. Indications were that the designs had first been cut into the plaster and



a. Stone-framed ventilator opening in No. 1



b. Wall decoration in No. 2

DETAILS IN SUBTERRANEAN KIVAS



a. Designs on wall of No. 2



b. Ventilator recess in No. 4.

then colored with a light pigment. Only a small amount of the latter remained when the kiva was excavated, hence it was necessary to retouch them in order to obtain photographs. In doing this the whitening was applied only to grooves plainly visible. Where there was any question concerning a mark it was left untouched. A curious thing about the pictures is that they show some markings not visible to a person standing in the remains of the chamber. This is particularly noticeable in the lower part of the larger design illustrated in Plate 14, *a*.

Why these decorations were placed on the wall of kiva 2 or what their ceremonial importance may have been, or what interpretation the symbols had, is not known. Painted kivas are not uncommon in the Southwest. The decorations on the walls vary from site to site, just as the designs on pottery differ to the extent that no two vessels exhibit identical patterns, but knowledge of the custom of painting such chambers has been in the possession of archeologists for many years. Nordenskiöld found an example during his investigations at the Mesa Verde in 1891.¹⁵ This ruin was excavated many years later by Doctor Fewkes and given the name Painted Kiva House.¹⁶ This was done because the two ceremonial chambers in the structure had painted walls. Nordenskiöld referred to these remains as ruin 9. Several years before the discovery at Mesa Verde, Mr. James Stevenson encountered ornamented circular chambers in Canyon del Muerto in northeastern Arizona.¹⁷ These were not fully described, however, until after Cosmos Mindeleff had completed his studies in the Canyons de Chelly and del Muerto.¹⁸ The so-called Snake Kiva in the Rito de Los Frijoles is another good example.¹⁹

In comparatively recent years there have been a number of finds of this nature. Morris reported one from a cliff house in Johnson Canyon in southern Colorado²⁰ and in his later work in the great kiva at Aztec, N. Mex., uncovered a fragment of plaster clinging to the wall which showed that the interior of that structure had also been embellished.²¹ Several small kivas in a group of ruins located near Cortez, Colo., were excavated by their owner, Lee Dawson, who discovered decorations on their walls. Painted walls were not confined to kivas, but they occurred in other rooms and occasionally a design is found on the exterior of buildings.²² The probabilities are

¹⁵ Nordenskiöld, G., 1893, pp. 16, 108-109; figs. 7, 76.

¹⁶ Fewkes, J. W., 1922, pp. 67-68.

¹⁷ Powell, J. W., 1886, p. xxxv.

¹⁸ Mindeleff, C., 1897, pp. 177-181.

¹⁹ Hewett, E. L., 1909 *b*, p. 661.

²⁰ Morris, E. H., 1919 *b*, p. 170; pls. 34, c, 35, a, b.

²¹ Morris, E. H., 1921 *a*, pp. 120-121.

²² Chapin, F. H., 1892, photographs facing pp. 143, 152; Fewkes, J. W., 1909 *a*, pp. 52-53; 1911 *b*, p. 32; 1921, pp. 87-88; Mindeleff, C., 1897, pp. 109, 146-147; Morris, E. H., 1928, pp. 335, 377-378, 383, 385; Nordenskiöld, G., 1893, pp. 108-109; figs. 77, 78, 79.

that a great deal more of this kind of work was done than present evidence indicates. The plaster is so frequently missing from the walls of ruins that it is not possible to tell whether painting had been present or not. Judging from the extent decoration was employed in rooms and kivas by more recent Pueblo peoples and the amount of it which is present in the houses and ceremonial chambers to-day, it is logical to suppose that the prehistoric structures were equally ornamented. The main element in the designs in kiva 2 is more suggestive of that used in the banding on one of the kivas described by Mindeleff than it is of any of the others to which reference was made.²³

The only evidence secured which indicates the relationship of kiva 2 to the rest of the village, in point of time, consists of some potsherds. The latter came from a bowl which had been broken and thrown aside. Some of the fragments were found on the floor of kiva 1 and the others were in kiva 2. Inasmuch as the pieces were on the floor in each of the chambers they indicate that a certain contemporaneity existed between them. Since kiva 1 bore evidence of being comparatively late in its construction, kiva 2 would seem to belong in the same category.

Kiva 2 measured 8 feet 11 inches (2.717 m.) on its east-west diameter and 9 feet 2 inches (2.794 m.) from north to south, at the top of the chamber. On the floor, due to the curve in the walls of the pit, the measurements were somewhat larger. The east-west diameter was 9 feet 6 inches (2.895 m.) and the north-south 9 feet 8 inches (2.946 m.). From the floor to the top of the wall at the ventilator side of the chamber was 6 feet 11 inches (2.108 m.), while at the north side it was 7 feet 3 inches (2.209 m.) The ventilator shaft measured 1 foot 6 inches (45.72 cm.) on a north-south line and 1 foot 3 inches (38.1 cm.) on an east-west. The shaft was 6 feet 8 inches (2.032 m.) deep. The horizontal passage was 1 foot (30.48 cm.) wide and 1 foot 9 inches (53.34 cm.) high where it opened into the shaft. Not including the shaft, the tunnel measured 2 feet 6 inches (76.2 cm.). The aperture in the wall of the kiva was 1 foot 8 inches (50.8 cm.) high and 11 inches (27.94 cm.) wide.

The deflector stone stood 1 foot 6 inches (45.72 cm.) from the ventilator opening. The deflector was 1 foot 8 inches (50.8 cm.) high, 1 foot 4 inches (40.64 cm.) wide, and 2 inches (5.08 cm.) thick. From the deflector to the fire pit was 1 foot (30.48 cm.). The fire pit measured 1 foot 6 inches (45.72 cm.) from north to south and 2 feet (60.96 cm.) from east to west. It had a depth of 10 inches (25.4 cm.). It was 1 foot 4 inches (40.64 cm.) from the edge of the

²³ Mindeleff, C., 1897, fig. 76; p. 181.

fire pit to the edge of the sipapu. The latter had a diameter of 5 inches (12.7 cm.) and a depth of 9 inches (22.86 cm.). The Katcina niche was 1 foot 9½ inches (54.61 cm.) above the floor. The niche was 10 inches (25.4 cm.) wide, 8½ inches (21.59 cm.) high, and 9½ inches (24.13 cm.) deep.

KIVA 3

Kiva 3 had a pit with a pronounced D-shape. As a matter of fact the subterranean portion of this structure closely approached the rectangular form. The east, west, and south sides were comparatively straight and met in definite corners. The north wall was curved but not in as marked a degree as in the other ceremonial chambers. It is easy to see from this example how the rectangular kivas of later periods could have developed through the flattening of the sides of curved rooms. The interior features of kiva 3 were few and simple. It had a recess at the south side, a ventilator, deflector, a stone between the deflector and fire pit, fire pit, sipapu, and Katcina niche. (Fig. 13.) The only stone used in this structure was at the recess-ventilator side of the room. Throughout the remainder of the chamber the adobe plaster had been applied to the native earth walls of the pit.

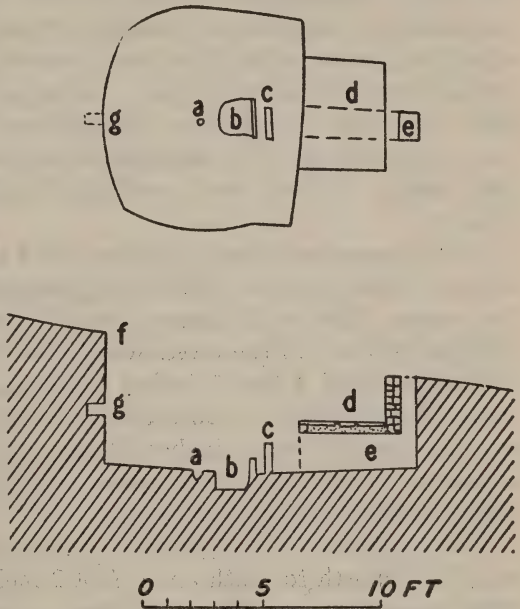


FIGURE 13.—Kiva No. 3. *a*, Sipapu; *b*, fire pit; *c*, deflector; *d*, ventilator recess; *e*, ventilator; *f*, ground level; *g*, Katcina niche

The recess and ventilator in kiva 3 were dug, as they had been in kiva 1, and then completed by filling in with stone masonry and adobe plaster. The only stone in the walls of the recess occurred where one side of the flue of the ventilator was closed with that material. The floor, however, had a flagging of large slabs. The horizontal passage of the ventilator had considerable stonework along its sides. The east wall of the tunnel was largely masonry, although from the front corner to halfway back in the passage the bottoms of the stones were 10 inches (25.4 cm.) above the floor. At

the west side of the passage the stonework rested on the floor, but it only extended 1 foot $1\frac{1}{2}$ inches (34.29 cm.) toward the shaft. The remainder was earth covered with adobe plaster. The ceiling of the passage was the same as those in the other ventilators. Poles and brush covered the trench and above them was a fill of débris upon which the slab paving of the recess floor rested. (Fig. 13.)

The deflector stone and its smaller neighbor in kiva 3 presented a similar combination to the one described for kiva 1. There was a slight difference between the two, however, in that the smaller stone in kiva 3 was a part of the fire pit. It constituted the south side of the latter, although it rose above the floor to a height sufficient to provide protection for the base end of the ladder. The other three sides of the fire pit consisted of native earth with a covering of adobe plaster which had been burned to a bricklike consistency by the fires kindled in the pit. The sipapu was a simple hole in the floor. Its only lining was a thin layer of plaster applied to its walls and bottom. The Katcina niche was circular in form and not very large. It had been carefully finished, however, with adobe plaster.

Kiva 3 measured 9 feet 4 inches (2.844 m.) on the east-west diameter and 8 feet 5 inches (2.565 m.) from north to south, not including the recess. The total distance from the north wall of the chamber to the south wall of the recess was 11 feet 10 inches (3.606 m.). The recess measured 4 feet 7 inches (1.397 m.) along the south wall, 3 feet 8 inches (1.117 m.) on the west, 3 feet 5 inches (1.041 m.) at the east side, and 4 feet 8 inches (1.422 m.) where it opened into the chamber. The floor of the recess was 2 feet 3 inches (68.58 cm.) above the floor of the kiva.

The ventilator opening on the ground level was 10 inches (25.4 cm.) from north to south and 1 foot 2 inches (35.56 cm.) on its east-west measurement. The shaft had a depth of 3 feet 11 inches (1.193 m.). The opening into the horizontal passage at the shaft end was 1 foot 3 inches (38.1 cm.) wide and 1 foot 6 inches (45.72 cm.) high. The passage was 4 feet 3 inches (1.295 m.) long. At the room the opening was 1 foot $3\frac{1}{2}$ inches (39.37 cm.) wide and 1 foot $10\frac{3}{4}$ inches (57.78 cm.) high. The deflector stone stood 1 foot 2 inches (35.56 cm.) from the aperture. The stone measured 1 foot 5 inches (43.18 cm.) wide, 1 foot $1\frac{1}{8}$ inches (33.34 cm.) high, and 2 inches (5.08 cm.) thick. From the deflector stone to the fire pit stone was 5 inches (12.7 cm.). This stone had a width of 1 foot $9\frac{1}{2}$ inches (54.61 cm.) and rose 9 inches (22.86 cm.) above the floor level. The total height of the stone was 1 foot 2 inches (35.56 cm.), but a part of this was in the fire pit. The fire pit measured 1 foot 4 inches (40.64 cm.) from north to south and 1 foot 6 inches

(45.72 cm.) from east to west. Its depth averaged 9 inches (22.86 cm.).

The sipapu was 9 inches (22.86 cm.) from the edge of the fire pit. The circular hole had a diameter of 3 inches (7.62 cm.) and a depth of 2 inches (5.08 cm.). This was the shallowest sipapu found at the site.

The Katcina niche in the north wall of the kiva was 2 feet 2 inches (66.04 cm.) above the floor. It was 6 inches (15.24 cm.) high and 6 inches (15.24 cm.) wide. Its depth was 9 inches (22.86 cm.). The wall at that side of the chamber was 5 feet 6 inches (1.676 m.) high. Indications were, however, that it had been somewhat higher and that erosive forces had carried away a part of the earth in that vicinity. This was true to an even more marked degree at the south side of the chamber. When the kiva was occupied it probably had a greater depth than was found during the excavations.

KIVA 4

Kiva 4 differed little in its general characteristics from the other subterranean dirt ceremonial chambers. The pit portion had a definite D-shape and there was a recess at the south side of the chamber. The only

stone used in its construction consisted of the slab paving on the floor of the recess, the masonry which closed the ventilator shaft at the south side of the recess, and the stones which filled in the wall of the chamber above the horizontal passage of the ventilator. The remainder of the walls were native earth covered with adobe plaster. The interior features were few and simple. They consisted of a ventilator, deflector, fire pit stone to protect the base end of the ladder, a fire pit, sipapu, a second hole in the floor near the sipapu, and a Katcina niche at the north side of the chamber. (Fig. 14.)

As in the case of the other kivas, 1 and 3, the recess and ventilator of kiva 4 had been dug into the earth at the same time that the exca-

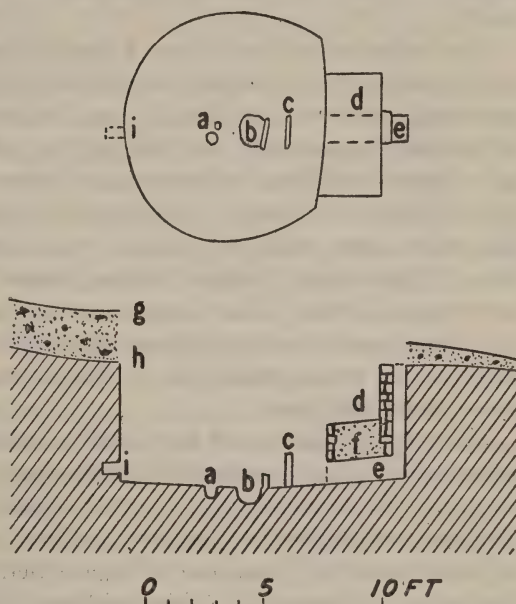


FIGURE 14.—Kiva No. 4. *a*, Sipapu; *b*, fire pit; *c*, deflector; *d*, ventilator recess; *e*, ventilator; *f*, fill above ventilator passage; *g*, present ground level; *h*, ground level at time kiva was built; *i*, Katcina niche

vation for the main part of the chamber was made. The horizontal passage for the ventilator was covered by poles, brush, and earth to the level of the recess floor, and the whole was covered by a flagging. The vertical shaft was closed with masonry and the upper portion of the trench above the ventilator aperture was filled in the same manner. In the case of the latter, however, a thick coating of plaster was applied over the stones and they did not show in the kiva wall. Those at the back of the recess were probably treated in the same manner, but the covering was not as thick and as a consequence it had all dropped off before the débris was removed from the interior of the chamber during the course of the recent investigations. (Pl. 14, b.)

The deflector in kiva 4 was a large stone slab set upright in the floor between the ventilator aperture and the fire pit. The second stone at the edge of the fire pit was like that in the fire pit of kiva 3. It not only constituted one side of the pit but rose above the floor to a height sufficient to protect the bottom of a ladder resting between it and the deflector. The other three sides of the fire pit were the native earth walls of the hole which had been dug for that feature. There was a lining of adobe plaster which was burned to the hardness of brick. The sipapu and the adjacent hole in the floor were simple cavities with plastered sides and bottoms. The Katsina niche was a rectangular hole in this kiva and was only a short distance above the floor.

The only indication of the position which kiva 4 occupied in the sequence of the community's development was in the relation of the pit to the accumulation of refuse above the original ground level. The excavation for the chamber had been made through the stratum of waste material from the village which had been deposited along that side of house A. This evidence indicated that it had been placed there subsequent to a comparatively long occupation of the site and for that reason it is assumed that it belonged to the final stages. There was nothing definite to show its actual relationship to the other dirt kivas. Its good condition and well-preserved interior suggested that it probably was one of the last constructed. This can not be stated as an actual fact, but may be offered as a suggestion. There seems little question, however, but that it belonged to the same general stage as the other ceremonial chambers of that type. From the broad point of view it is not really essential to state that it was the second or last of the group.

Kiva 4 measured 9 feet 8 inches (2.946 m.) on its east-west diameter and 8 feet 6 inches (2.591 m.) on the north-south, not including the recess. The total measurement from the north wall of the chamber to the south wall of the recess was 10 feet 10½ inches

(3.314 m.). The south wall of the recess was 5 feet 2 inches (1.574 m.) long. The east wall measured 2 feet 5 inches (73.66 cm.) and the west 2 feet 9 inches (83.82 cm.). The aperture into the chamber was 5 feet 1 inch (1.549 m.) from wall to wall.

The upper end of the ventilator flue, on the ground level, measured 9 inches (22.86 cm.) from north to south and 1 foot 1½ inches (34.29 cm.) from east to west. The shaft was 4 feet 11 inches (1.498 m.) deep. The horizontal passage was 1 foot 2 inches (35.56 cm.) wide and 1 foot (30.48 cm.) high where it opened into the shaft. The tunnel was 2 feet 9 inches (83.82 cm.) long. The aperture into the chamber was 1 foot (30.48 cm.) high. At the bottom it was 1 foot ¾ inch (32.38 cm.) wide and at the top it was only 7½ inches (19.05 cm.) wide.

The deflector stone stood 1 foot 5 inches (43.18 cm.) from the ventilator opening. The stone was 1 foot 7 inches (48.26 cm.) wide, 1 foot 5¾ inches (45.08 cm.) high, and 1½ inches (3.81 cm.) thick. From the base of the deflector stone to the fire pit or ladder stone was 8 inches (20.32 cm.). This stone was 1 foot 5½ inches (44.45 cm.) wide. Its top was 7 inches (17.78 cm.) above the floor level. It extended down into the pit for several inches, but its exact measurement on that line could not be determined because of the plaster which covered it. To have obtained this information would have required the destruction of the lining of the pit. The measurement was not deemed sufficiently important to warrant such action. The fire pit measured 1 foot (30.48 cm.) from north to south and 1 foot 4 inches (40.64 cm.) from east to west. It had an average depth of 7 inches (17.78 cm.).

The sipapu was 1 foot (30.48 cm.) from the edge of the fire pit. The hole was not round but oval in contour. The north-south diameter measured 5¼ inches (13.34 cm.) and the east-west one 6 inches (15.24 cm.). The hole had a depth of 7½ inches (19.05 cm.). The small hole at the side of the sipapu was 10 inches (25.4 cm.) from the fire pit and 3 inches (7.62 cm.) from the sipapu. It was 3¼ inches (8.25 cm.) in diameter from north to south and 2¾ inches (6.98 cm.) from east to west. The depth was 1½ inches (3.81 cm.).

The Katcina niche at the north side of the room was 4 inches (10.16 cm.) above the floor. The hole measured 5½ inches (13.97 cm.) wide by 5½ inches (13.97 cm.) high. The depth was 8½ inches (21.59 cm.).

At the north side of the kiva the wall measured 5 feet (1.524 m.) from the floor to the old original ground level. From the floor to the top of the refuse layer was 7 feet 3 inches (2.209 m.). This probably approximates the depth of the pit at the time when it formed the major portion of the ceremonial chamber.

THE GREAT KIVAS

The finding of two great kivas at one location in the Zuñi district was unexpected and introduced a factor of considerable importance. They demonstrated that the superceremonial chamber had a wider distribution than had previously been suspected and definitely evidenced a strong northern element in the community. Investigations in the Southwest have shown that such structures are generally associated with some form of a Chaco culture, although it is possible that the type attained its greatest elaboration in the southern Colorado region and then was introduced into the Chaco district. This problem is one which has not been completely worked out and as a consequence no definite conclusions can be drawn at the present time.

The presence of the two great kivas at this site, together with the type of masonry in the original part of house A and the occurrence of pottery showing a distinct Chacoan character, is a good indication that the village was founded by a Chaco group or one directly influenced by that center. As previously stated, great kiva No. 1 was completely excavated, while only the walls of No. 2 were traced. Because of this it is possible to give a detailed description of only one of the structures.

Great kiva No. 1 was attached to the main building and was partially subterranean and partially above ground. The lower portion of the chamber, from the top of the main bench to the floor, was dug into the earth. The sides of the pit were faced with stone masonry, and the ground furnished the top of the bench. The outer wall was erected from the bench level, except at the north side of the structure where the slope of the ground made it necessary to do a certain amount of digging to maintain an approximately even top for the bench. For that reason the outer wall for a short distance served as a facing for the sides of the upper part of the pit. A portion of the northern arc of the bench was raised to the level of the north chamber for the kiva. Below the main bench, completely encircling the chamber, was a second, small, low bench. Interior features consisted of the remains of the four masonry pillars which had supported the roof, two subfloor vaults, two simple pits in the floor, a fire pit, and a hole in the floor which may have functioned as a sipapu. (Fig. 15; pl. 15, *a*, *b*.) At the west side of the chamber, from approximately the middle of the subfloor vault to the north wall, the floor was at a higher level than elsewhere, and the edge of the low platform was reinforced with stones. (Pl. 16, *a*.)

The four masonry pillars which supported the roof were placed at about the same distances from the bench at four sides of the chamber and in such positions that they formed a rectangle. (Fig. 15, *e*.) They probably carried heavy stringers, which in turn sup-



a. Southern half of chamber showing pillar remains, subfloor vaults, and fire pits

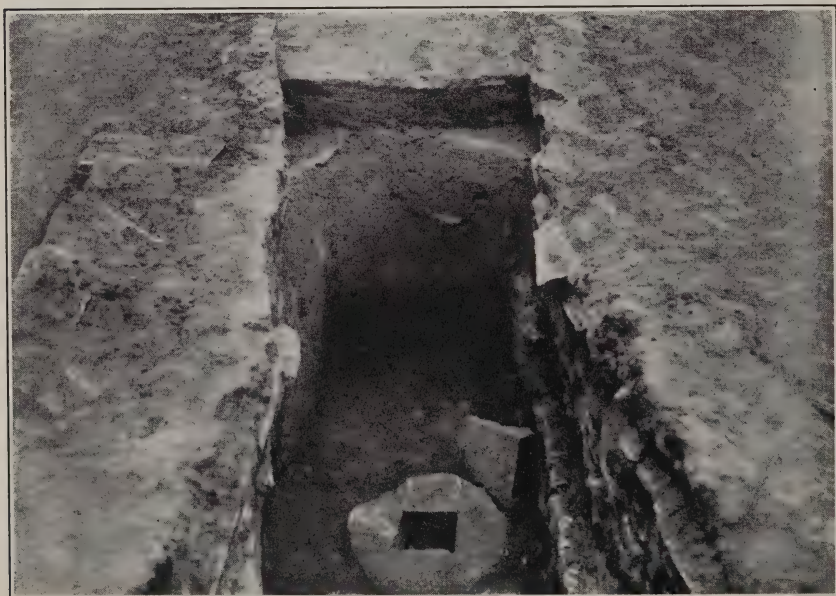


b. North side of room; alcove behind standing figures

GREAT KIVA NO. 1



a. West subfloor vault, dais, and pillar base



b. Interior of vault at west side of chamber

ported other timbers used in the superstructure. The pillars had an interesting form of construction. They consisted largely of blocks of stone carefully laid in adobe mortar, but there was an

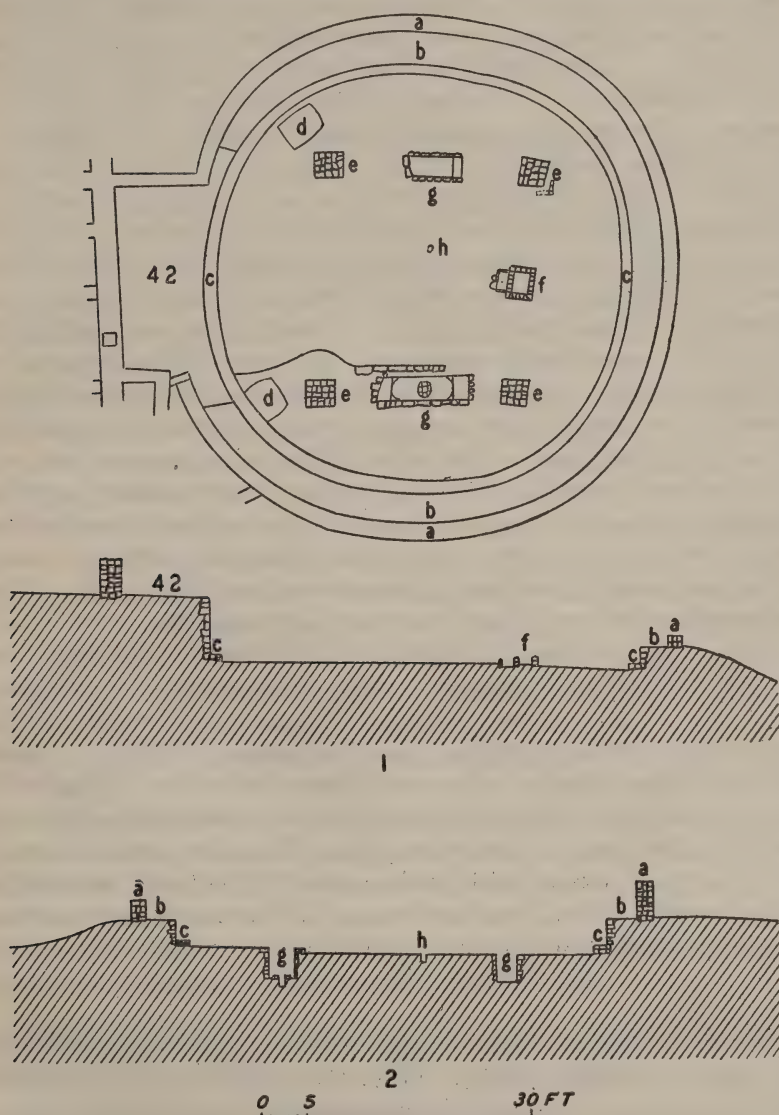


FIGURE 15.—Plan and sections of Great Kiva No. 1. *a*, Outer walls; *b*, upper bench; *c*, lower bench; *d*, holes in floor; *e*, support pillars; *f*, fire pit; *g*, subfloor vaults; *h*, sipapu

occasional course of cedar poles placed side by side and covered with mud plaster. There would be several courses of stone, then one of poles, several more of stone, and then another of wood. The poles were not all laid in the same direction. In one course they ran

north and south and in the next east and west. Whether this was done with an idea of strengthening the pillar and binding the stone into a more compact mass or whether some ceremonial import was attached to the method of arrangement is not known. The use of both wood and stone in pillars of this type was not a unique feature of kiva No. 1. The pillars in the great kiva at Aztec exhibit the same characteristic. In the case of the latter, however, more poles were used. Every other course consisted of wood. The practice of alternating the direction in which the poles were laid also prevailed at Aztec.²⁴ Hence it would seem to be a structural characteristic. The pillars in kiva No. 1 only rose a short distance above the floor when the débris was cleared from the interior of the chamber, but there was sufficient fallen material from each to show that it had attained to a considerable height. Except for the southeast pillar, there was no secondary masonry at the bases of the supports for the superstructure. In the case of the one example where such was present it consisted of a low L-shaped wall approximately paralleling the south and west sides of the pillar. This bit of masonry was only a few courses in height and was completely detached from the pillar. The south segment of the wall was still in position when the floor was cleared, but the west portion had fallen over and only marks on the floor made it possible to determine where it had stood. What the purpose of this wall may have been is not known.

Between the two north pillars and the bench of the kiva were two approximately rectangular basins or depressions in the floor. (Fig. 15, *d*.) There was nothing in them to indicate what their function was or to suggest a plausible reason for their presence. They were dug into the native earth beneath the floor. Their sides were not vertical. Instead they had a pronounced slope and curved toward the bottoms of the depressions. The sides and bottoms of the basins were covered with adobe plaster. The latter was applied at the same time that the floor was laid in the kiva because there were no indications of a break between the two around the edges of the depressions. As a matter of fact, one operation probably served to cover both.

At the east and west sides of the chamber, lying between the pillars, were two subfloor vaults. (Fig. 15, *g*; pl. 15, *a*.) That at the west side was more complex in its structure and in many respects quite similar to the one described for kiva A in the main building. Both vaults had been dug into the undisturbed soil beneath the floor, and their walls were partially faced with masonry. At each end of the two vaults was a small platform slightly below the floor level which corresponded to the shelf-like features described for the pit in kiva A. The upper borders of the vaults were framed with cop-

²⁴ Morris, E. H., 1921 *a*, pp. 117-118.

ings of stones set with their tops flush with the floor level. The sides of the vaults were practically vertical. The ends, however, sloped to a certain extent from the edges of the shelf-like platforms. This was more pronounced at the south end of the east vault than it was in the west pit. (Fig. 2, sec. *d*.) The bottom of the east vault sloped from north to south at such a degree that the pit seemed not to have a real bottom. (Fig. 2, sec. *d*.)

Quite the reverse was true of the west vault, which had a distinct and fairly level bottom. The latter also had a small receptacle in the center of the floor similar in location and nature to the basin in the bottom of the vault in kiva A. The difference between the two was that the one in the great kiva was framed with stone and had a stone lid (pl. 16, *b*) instead of a rim or coping of adobe. When the accumulated débris was cleared from this vault the cover stone was in place over the opening to the box. The latter had a stone bottom, but its walls were of the native earth into which it had been dug. There was nothing in the receptacle in the nature of offerings and no indications as to its purpose. Morris found a similarly located oval-shaped hole in the bottom of the west vault in the great kiva at Aztec. There was an additional hole, however, near the southeast corner of the vault. Both contained offerings of turquoise, and in addition the one near the center had some shell beads and that in the corner yielded an intentionally worked sphere of copper ore.²⁵ In this they differed from the empty example in great kiva No. 1. The latter may have been intended as a depository for ceremonial gifts which were removed when the chamber was abandoned. This is offered only as a suggestion. The mere absence of offerings can not be construed as an indication that such were removed. Objects of such a nature may never have been placed there. Whether the hole was symbolic of some mythical place of emergence, like that in the Acoma pits discussed in connection with the vault in kiva A, or had some other purpose is not known at the present time. Future work may reveal the significance of the feature, although evidence now available does not.

As previously mentioned, the subfloor vaults in great kivas have presented a problem whose solution has eluded the archeologist. They have been endowed with every conceivable function and have called forth a great amount of speculation. The common belief at first was that they were huge fire pits; some called them cremation pits. Others considered them depositories for the ashes from the sacred fire which was kept burning in the kiva, assuming that the ancient Pueblos tended such a flame. The weight of evidence at the present time is against any of the subfloor vaults having served as fire pits. Morris did not find such to have been the case at

²⁵ Morris, E. H., 1921 *a*, pp. 119, 133.

Aztec;²⁶ neither of the two at Hawikuh, in small kivas, to be sure, gave any indication of such use;²⁷ and not one of the four in the kivas at the Zuñi Reservation village bore signs of burning. Hewett considered the examples in Chettro Kettle in the Chaco Canyon to be great fire pits,²⁸ but Hodge took exception to such a conclusion, and later investigations have borne out his contentions.²⁹ From this it would appear that the fire-pit suggestion in all of its ramifications should be ruled out. They may have functioned as sounding boxes or oversized drums, in the manner described in the discussion of the kiva A vault, or they may have been for an entirely different purpose. The subfloor vaults certainly had a definite place in the great-kiva complex, but their true function is still to be learned.

The place for the fire in the great kiva was not near the center of the chamber, as in the smaller structures, but was placed well to one side, midway between the two south pillars. (Fig. 15, *f*.) It was both a pit and a fire box. Its larger section consisted of masonry walls erected on and rising above the floor level. The smaller part was a shallow pit at the north side of the masonry. It was faced on three sides by small slabs of stone. Most of these were set in an upright position in the floor. A small section of the north side was reinforced by horizontally laid blocks, however. The north wall of the raised fire box furnished the south side of the pit. The small portion was later in its construction than the other and did not give evidence of a very long period of use. The walls of the fire box did not rise to their original height when the chamber was cleaned out. Only two courses of stones remained. There was sufficient fallen material, however, to indicate that the top had originally been about 1 foot 6 inches (45.72 cm.) above the floor. The part still intact was filled with fine wood ashes, and the fallen portions had a plentiful admixture of them in with the stones and burned plaster. This showed that a fire had burned over a considerable period in the box. In all of its general features the masonry box corresponded to the one in the great kiva at Aztec.³⁰ Mr. Morris's discussion of the latter is equally applicable to the one in great kiva No. 1. He wrote:

There can be little doubt that the masonry box midway between the south ends of the vaults was a fire altar. In the normal kiva the fireplace is a pit at or near the center of the floor. Here it is raised above the floor and framed with substantial walls of stone. Convenience or caprice would not have justified so wide a breach of custom. It is the belief of the writer that the flame which burned within this inclosure was held in greater reverence than

²⁶ Morris, E. H., 1921 *a*, pp. 132-135.

²⁷ Hodge, F. W., 1923, p. 36.

²⁸ Hewett, E. L., 1922, pp. 125-126.

²⁹ Hodge, F. W., 1923, pp. 36-37.

³⁰ Morris, E. H., 1921 *a*, p. 119.

those which warmed and lighted the other kivas of the village, and was no less than the sacred fire of the community.³¹

Why the second smaller fire container should have been placed alongside of the larger one and what significance was attached to it is a matter for speculation. There was no evidence to explain it in a satisfactory manner. One suggestion is that it was for ordinary rather than sacred purposes. An occasional fire for the preparation of food may have been kindled there, in order that the regular flame be not profaned by common usage. Another explanation is that for some reason or other the larger container was abandoned and the smaller substituted for it. If such were the case it probably did not long antedate the abandonment of the chamber, because the amount of ashes in the smaller compartment indicated only a comparatively short period of use.

Close to the center of the chamber was a small circular hole in the floor which may have been a sipapu. Its position was such as to suggest that feature. Whether it fulfilled that function or not is an unanswerable question. The hole was cylindrical in form and filled with clean sand. The sides and bottom were covered with adobe plaster. It was the only one of its kind in the kiva. This is in decided contrast to the condition found at Aztec. The floor of the great kiva there was literally filled with a variety of small holes.³² No satisfactory explanation as to their purpose was obtained,³³ hence they can be of little assistance in explaining the presence of the single one in this kiva. Unfortunately, for comparative purposes, so little is available on the only other great kivas excavated, those in Pueblo Bonito and Chetro Kettle, that reference can not be made to them.

The two benches in the great kiva proved somewhat puzzling. (Fig. 15, *b*, *c*.) The larger occurred at about the height at which benches are usually found in ceremonial structures, while the top of the second was only a few inches above the floor level, in some places flush with it. It was thought at first that this low, narrow ring might be the top of an older structure which had been replaced by a later and larger one. Trenches dug along the wall soon showed this to be an erroneous supposition, as the courses of stone at most extended only a few inches below the floor and in several places the bottom row rested on it. There is no doubt that the small, low bench was a definite architectural feature and had some function. What the latter may have been, however, has not been determined. Mr. Morris found the same situation at Aztec³⁴ and was equally at a loss to explain the meaning. The larger bench had a broad top and was faced with masonry around all but a small section of its cir-

³¹ Morris, E. H., 1921 *a*, p. 133.

³² Morris, E. H., 1921 *a*, p. 120.

³³ Morris, E. H., 1921 *a*, p. 133.

³⁴ Morris, E. H., 1921 *a*, pp. 115, 129-130.

cumference. For a distance of several feet the earth wall of the excavation served as the face of the bench. (Pl. 16, *a*.) What whim of the builders led to the omission of the stone at this particular spot in the wall is another question which only can conjecturally be answered. A shortage of material in properly worked form and a desire to hurry and complete the job could easily have caused such a lapse. When the plaster had been applied to the face of the bench the fact that a certain section had been slighted would not be noticeable, and the workmen took advantage of it. An occasional piece of slipshod craftsmanship seems to have been an early American development. Irrespective of what light the foregoing is viewed in, it must candidly be stated that the plastered earth wall probably was as serviceable and satisfactory as one of stone. Nowhere in the face of the bench was there a niche or pocket of the Katcina niche variety.

The larger bench did not completely encircle the chamber. A section of the northern arc was broken by a block of masonry which rose from the top of the small bench to the floor level of the chamber at that side. This north chamber constituted another great kiva characteristic present in the example connected with house A. On the plan of the ruin this room bears the number 42. (Pl. 1; fig. 15.) It formed an integral part of the kiva, however, and perhaps should have been designated the north chamber or alcove. The inclosure was featureless from the standpoint of interior furnishings. It was bounded on three sides by the walls of adjacent rooms, and on the fourth, the south, opened into the kiva, breaking the continuity of the bench. There was nothing to indicate that a wall of any kind had been placed between it and the circular room. Hence there is no doubt that it must have opened into the kiva. The feature was not unique in this great kiva because a similar condition was found at Aztec³⁵ and in the Chaco Canyon. The superceremonial chambers at Aztec, Pueblo Bonito, and Chetro Kettle had built-in stairways leading from the kiva to the alcove.

No such provision had been made for gaining access to the north chamber of great kiva No. 1. A small section in the face of the wall rising from the small bench to the alcove floor suggested that the builders intended to construct such a feature. For some reason they changed their minds and filled in the opening, and the upper courses of stone in the wall continued across the blocked aperture unbroken. This is clearly shown in Plate 15, *b*, where the break appears to the left of the standing figures. A trench was dug in the floor of the alcove to determine whether there had been a stairway, later abandoned, at this point. Although the digging was continued down to the foundation of the wall, there was nothing

³⁵ Morris, E. H., 1921 *a*, p. 121.

to show that such had been the case. If people passed from the alcove to the floor of the kiva, and vice versa, a movable ladder probably furnished the means for so doing. That the alcove had ceremonial significance may be assumed from the fact that in the great kivas located elsewhere these chambers gave every indication of serving as shrine or altar rooms. None of the interior features present in the other examples were found here, but at least a place was provided for them.

There were no peripheral chambers, strictly speaking, around great kiva No. 1. There were bordering rooms at the north and east sides, rooms 35 to 39 and 47 (pl. 1; fig. 4), but they can not properly be considered examples of the type of chambers usually associated with great kivas.³⁶ Furthermore, it will be recalled that in the discussion of these rooms it was pointed out that the group 35 to 39 was of later construction than the great kiva. In the other large ceremonial houses the encircling rooms constituted an integral part of the structure. They no doubt had a certain significance with respect to the structure as a whole, but that they were not indispensable is shown by their absence in both great kivas at this location.

The problem of roofing the kiva unquestionably was a difficult one, and just how it was accomplished is not known. That a superstructure had once covered the great pit was shown by the burned remains of timbers which were found lying on the floor. They furnished a partial, though not sufficient, clue to enable a complete restoration. There is no question that the four pillars supported large stringers or beams which formed a rectangular framework.

Smaller poles radiated from this frame to the outer wall of the structure, and the central portion, within the bounds of the rectangle, probably had a flat ceiling. This was indicated satisfactorily by the remains of the timbers. Two decidedly important factors could not be determined, however. The first of these was where the outer ends of the peripheral poles had rested, and the second was with respect to the covering at the north side, the alcove portion of the structure.

It was not possible to determine whether the outer ends of the radial poles had been supported by the wall of the structure or had sloped down and rested in the angle formed by it and the top of the main bench. So far as the evidence went, either might have been the case. The results would have been quite different, however. One method would give sloping sides to the superstructure, the other a practically continuous flat roof.

An intricate part of this problem is the relation between the covering on the alcove and that on the kiva. There was clear indication

³⁶ Morris, E. H., 1921 a, fig. 2.

that the alcove had had a flat ceiling supported by a heavy beam running the long way of the room, from east to west, at the open side. Smaller poles extended from this beam to the back wall. The question which arises is, was the space intervening between this main beam and the north stringer on top of the masonry pillars covered by a flat roof or did it slope down to join the kiva superstructure at a lower level? The ceiling in the alcove had been approximately 7 feet (2.133 m.) above the floor. With a proper allowance for thickness, the roof would have been about 8 feet (2.438 m.) above the ground. Consequently, in order to provide a continuous flat roof out over the north side of the kiva it would have been necessary for the stone pillars to have been 15 feet (4.572 m.) in height. There was not sufficient fallen material in the débris surrounding them to warrant the conclusion that they had been more than 12 feet (3.657 m.) high. Hence it would seem logical to suppose that there was a slight slant from the edge of the alcove roof to that covering the central portion of the kiva. Reverting to the position of the radial poles in this connection, several things must be considered. If the pillars had been 15 feet (4.572 m.) high and these poles were placed in an approximately horizontal plane, the outer wall would have had to rise 12 feet 6 inches (3.81 m.) above the ground level.

The fallen material was only sufficient to warrant the conclusion that there had been an 8-foot (2.438 m.) wall. Even with 12-foot (3.657 m.) pillars there would still of necessity be a slope in the radial part of the superstructure between the central framework and the outer wall. Such an arrangement would have given a slight dome shape to the superstructure. Had the radial poles rested at the back of the bench instead of higher up in the outer wall the latter would have been even more pronounced. With such an arrangement the space above the timbers and inside the wall would be filled with earth up to the level of the wall top. Which of the last two forms of superstructure actually covered the chamber could not be determined. The outer wall did not appear to have been heavy enough to support timbers placed near its top, especially when they were in a slanting position. On the other hand, there were no pole impressions in the bench top along the back wall.

At the alcove side there would have been a gap between the timbers sloping from the edge of that chamber's covering and the main north stringer of the kiva, unless, of course, the complete roof had been entirely flat. This gap could have been bridged without much difficulty by placing a series of small poles across from the one group of timbers to the other. The task would have required more care if the radial supports rested on the bench top, but was not beyond the builders' ability.

Great kiva No. 1 measured 51 feet (15.545 m.) on a north-south line above the large bench. Above the smaller bench on the same diameter it was 47 feet 6 inches (14.478 m.) from wall to wall. On the floor, from lower bench to lower bench, it was 45 feet (13.716 m.). The east-west diameter above the bench was longer than the north-south because the latter was reduced by the alcove projection. Above the main bench, then, great kiva No. 1 measured 54 feet 6 inches (16.611 m.) from east to west. Inside the large bench and just above the small one the same line was 47 feet 8 inches (14.529 m.). Below the top of the small bench the diameter was 45 feet (13.716 m.), the same as that of the north-south.

The main bench ranged from 3 feet 6 inches (1.066 m.) to 2 feet 2 inches (66.04 cm.) in width. The narrowest portion occurred at the east end of the alcove projection. The average height of the main bench above the floor was 2 feet 6 inches (76.2 cm.). The small bench varied between 1 foot (30.48 cm.) and 1 foot 6 inches (45.72 cm.) in width. Its top ranged from the floor level on the east side to 6 inches (15.24 cm.) above it at the north and south.

Three of the support pillars measured 3 feet (91.44 cm.) by 3 feet 6 inches (1.066 m.), while the fourth, the southwest, was only 2 feet (60.96 cm.) by 2 feet 6 inches (76.2 cm.). None of them stood more than 1 foot (30.48 cm.) in height. The northeast pillar was 5 feet 6 inches (1.676 m.) from the edge of the small bench. The southeast one was set 4 feet 6 inches (1.371 m.) into the room and that at the southwest was the same distance from the lower bench. The northwest pillar was closer to the wall. It was only 4 feet (1.219 m.) from the bottom bench. The distance between the northeast and southeast pillars measured 19 feet 6 inches (5.943 m.) and between the southeast and southwest 21 feet 6 inches (6.553 m.). The northwest and southwest ones were 19 feet 6 inches (5.943 m.) apart, while 22 feet 4 inches (6.807 m.) separated the two northern ones.

The eastern subfloor vault was 6 feet 6 inches (1.981 m.) from the northeast pillar and 6 feet 6 inches (1.981 m.) from the southeast. The vault measured 6 feet 6 inches (1.981 m.) by 2 feet 2 inches (66.04 cm.), and its greatest depth was 4 feet (1.219 m.). The shelf at the north end was 8 inches (20.32 cm.) wide and that at the south 1 foot (30.48 cm.). The top of the north one was only 3 inches (7.62 cm.) below the floor, while that at the south was 6 inches (15.24 cm.) lower. The inside edge of the vault was 9 feet (2.743 m.) from the edge of the lower bench at the south side of the chamber.

The subfloor vault at the west side of the chamber was 4 feet 8 inches (1.422 m.) from the northwest pillar and 3 feet 8 inches (1.117 m.) from the southeast. The vault had a total inside length of 10 feet (3.048 m.) and an average width of 2 feet 6 inches

(76.2 cm.). Its average depth was 3 feet 6 inches (1.066 m.). The shelf at the north end was from 1 foot (30.48 cm.) to 1 foot 6 inches (45.72 cm.) wide. That at the south was 1 foot 8 inches (50.8 cm.) wide. The tops of the shelves were 3 inches (7.62 cm.) below the floor level. Six inches (15.24 cm.) below the shelf at each end there were small corner offsets (pl. 16, *b*) where the rounded ends of the bottom portion of the vault met the upper. The inside edge of the vault was exactly 9 feet (2.743 m.) from the west lower bench edge. The small box at the bottom of the vault was 6 inches (15.24 cm.) square and 1 foot 10 inches (55.88 cm.) deep.

The platformlike feature at the west side of the chamber which set the subfloor vault off from the remaining floor level was 6 inches (15.24 cm.) higher than the latter. This variation did not hold true for the entire west side of the kiva but only for about one-half, as indicated on the ground plan. (Fig. 15.) Beginning gradually at about the center, it soon became a pronounced dais.

The pits at the north side of the kiva (fig. 15, *d*) were approximately the same size. That near the northeast pillar was 4 feet 6 inches (1.371 m.) long by 3 feet 6 inches (1.066 m.) wide. Its depth was 1 foot 3 inches (38.1 cm.). The pit between the pillar and bench at the west side was 4 feet 5 inches (1.346 m.) long, 3 feet 6 inches (1.066 m.) wide, and 1 foot (30.48 cm.) deep.

The alcove, or north chamber, room 42 on the plan, measured 20 feet 5 inches (6.223 m.) the long way and 9 feet 2 inches (2.794 m.) the short way. Its floor was 7 feet 3 inches (2.209 m.) above that of the kiva.

Great kiva No. 2, as previously stated, was located in the court formed by the ruins of the three communal houses, A and B, and the small structure to the south in which only one room was excavated. (Pl. 1.) This circular structure was not cleared of the débris which had accumulated in it since it had been abandoned and fallen into decay, but its outer walls were traced and its size determined. Great kiva No. 2 is the largest yet discovered. Its average diameter of 78 feet (23.774 m.) places it at the head of the list. Casa Rinconada in the Chaco Canyon, with a diameter of 72 feet (21.946 m.), has long been regarded as preeminent among the super-ceremonial houses, but it can not measure up to great kiva No. 2. The great kiva at Chetro Kettle, also in the Chaco Canyon, the so-called Great Bowl, is much smaller. Its reported diameter is only 62 feet 6 inches (19.050 m.).³⁷ That in Pueblo Bonito is slightly less in diameter than its neighbor and measures 60 feet (18.288 m.) across. The example at Aztec has the smallest diameter of the group, 48 feet 3½ inches (14.719 m.).³⁸ The triple walled tower found by Holmes along the San Juan River has frequently been

³⁷ Hewett, E. L., 1922, p. 122.

³⁸ Morris, E. H., 1921 *a*, p. 115.

referred to as the largest example because the diameter of its outer walls measured 140 feet (42.672 m.),⁸⁹ but it does not seem that this structure should be regarded as a great kiva. It may have had an analogous purpose but is not of the exact type.

Because of the lack of excavation in great kiva No. 2 it is not possible to discuss its interior features. It may be assumed that it contained characteristic elements, inasmuch as No. 1 had them. Trenching inside of the outer wall showed that there was a bench and that the north alcove was present. (Pl. 1.) There were clear indications of the stone pillars which supported the superstructure. Whether there were subfloor vaults or not only excavation can determine. The outer wall had never risen much higher than a few feet above the ground level, judging from the amount of fallen stones. For this reason it seems likely that the structure, if it actually was completed, must have had sloping side walls and have been covered with plaster. This would have produced a large, domelike feature in the center of the village which would not have been unpleasing in appearance. This again, however, can be learned only by excavation.

The relation of great kiva No. 2 to great kiva No. 1 and house A is shown clearly by the section through it and the other structures to the top of the cliff back of A. (Fig. 16.) It was at a considerably lower level, in fact was built in a slight basin which constituted the open space around which the dwellings were erected.

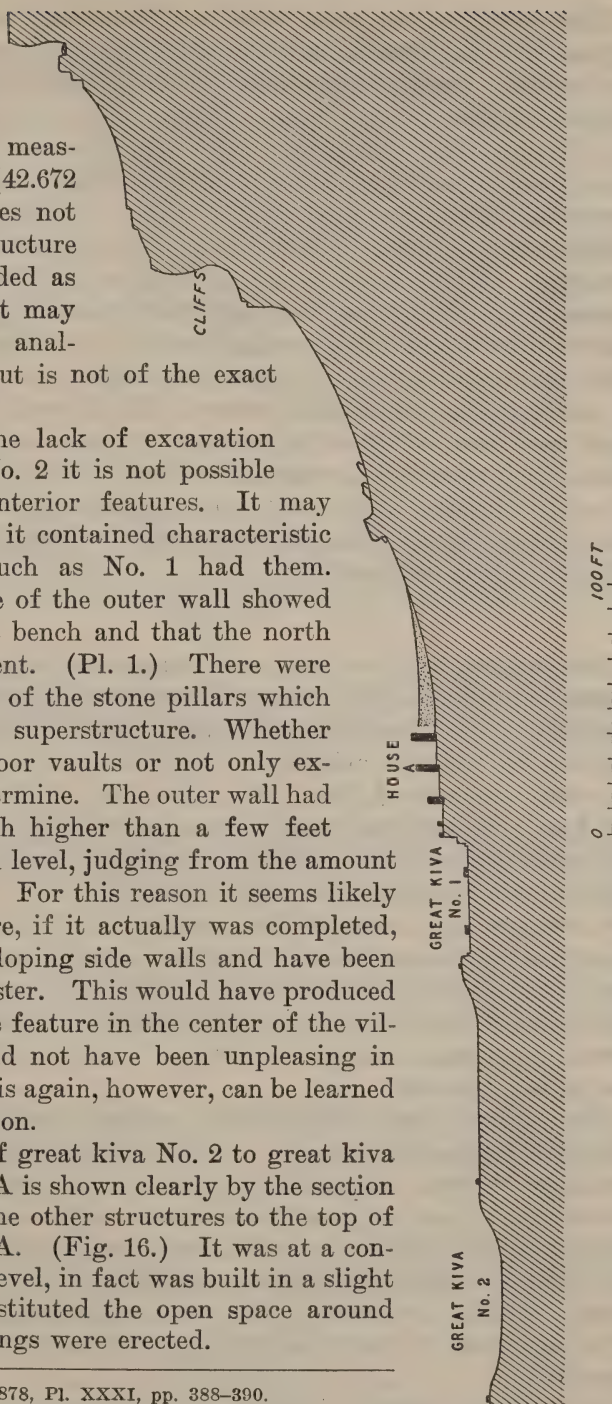


FIGURE 16.—Section through great kivas 1 and 2, house A, and cliff

⁸⁹ Holmes, W. H., 1878, Pl. XXXI, pp. 388-390.

The presence of two great kivas in a community of this size might suggest that the ceremonial side of its life was considerably over-emphasized. On the other hand, it is possible that this was the religious center for the entire district. If such was the case it may be postulated that people from all of the many small villages roundabout, none of whose ruins indicate the presence of a large ceremonial house, gathered here at times of major ritualistic significance to take part in the rites performed in the great circular structures. Again, there is nothing to show that the two were contemporaneous. Evidence indicated that great kiva No. 1 had been destroyed by fire and it is possible that No. 2 was built to replace it. Here again one can only suggest, because the true facts in the case lie buried in the *débris*-filled interior. At all events these structures must have been of great importance, because, as previously mentioned, they represent a tremendous amount of labor on the part of a people equipped only with stone implements. Furthermore, as also has been stated before, they definitely indicate a strong northern influence in the community.

HOUSE B

The smaller of the two main dwellings in the village, house B, was a structure containing 20 rooms. It was located some distance southwest from house A on the top of a slight knoll. (Pls. 1; 17, *a.*) The building did not give evidence of growth stages as distinct as those described for house A, but it did show that a fairly small structure had been enlarged from time to time by erection of new chambers. The general plan of the completed house was that of a rectangular block of rooms with a small court at the east side. (Fig. 17.) Had the structure been occupied for a greater length of time it is quite probable that the court would have been closed in and thus converted into another room. At first it was thought that a ceremonial chamber of the circular, subterranean type might have been placed there. Trenching through the earth in that vicinity failed to reveal such a structure, however.

The original part of the building probably included rooms 15 to 19 and a portion of room 11. Later additions and attendant remodeling activities changed that portion of the structure to such an extent that it was not possible to determine the exact status of the initial dwelling. Abutting walls clearly demonstrated that rooms 12, 14, 17, and 20 were constructed subsequent to the group just mentioned. This also was true of the series from 1 to 10. Beyond that it is impossible to go in establishing the story of the structure's growth.

The walls in house B, like those in the later portions of A, were built of cubical blocks. (Pls. 17, *b*; 18, *a.*) But in contrast to the

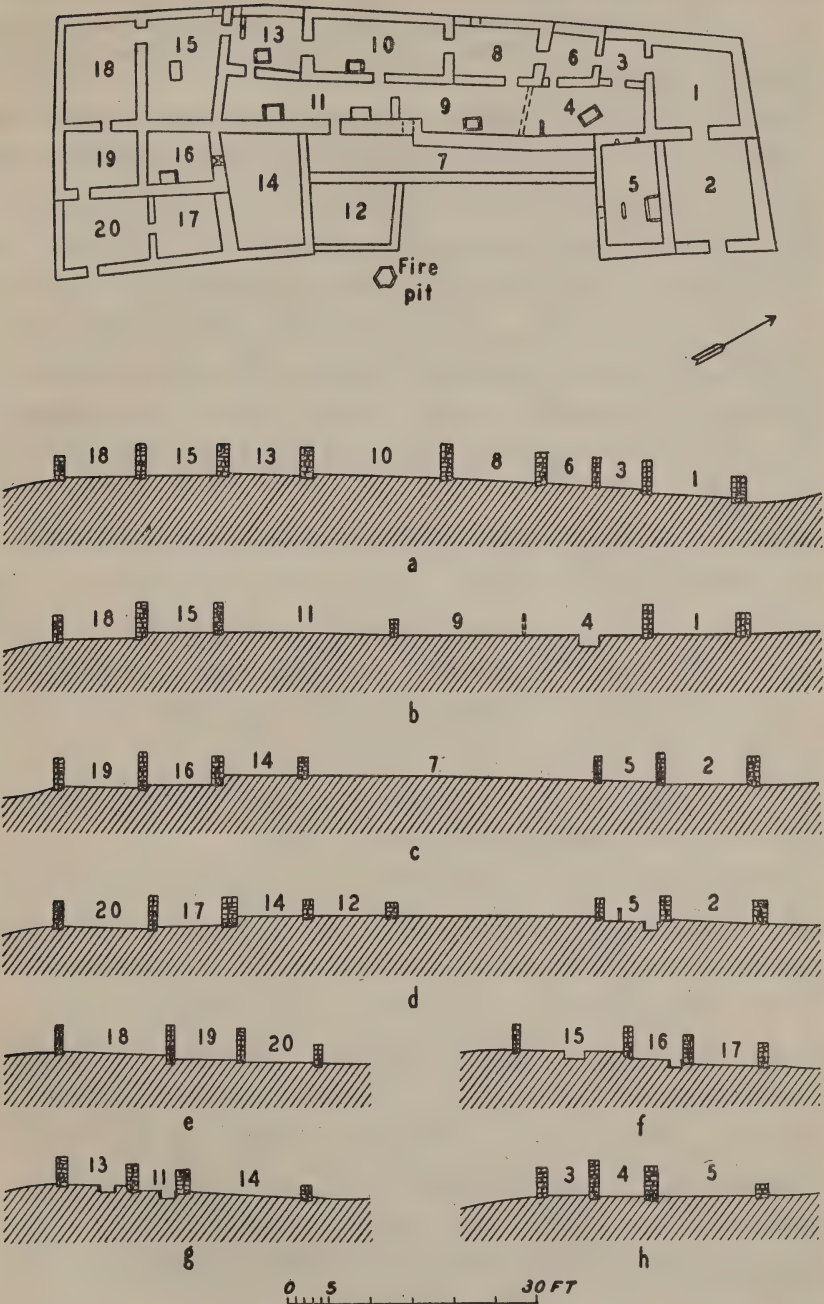


FIGURE 17.—Plan and sections of house B

masonry in the larger building the stones used in this structure had been more carefully worked and shaped. It is possible that house B may have been erected by the same group, or one related to it, which built the later portions of house A. In this instance, however, the results were better.

There was nothing of particular interest in a majority of the rooms in house B. In a few instances there were features which warrant a more detailed consideration. Room 5 may be mentioned in this connection. Like rooms 20 and 50 in house A, it suggested that it might have had some ceremonial significance. It had a distinct ventilator at the south side and a deflector between it and the fire pit. (Fig. 17, room 5.) The inclosure may have functioned as a rectangular kiva or, as in the case of the other rooms mentioned, possibly was a fraternity chamber. It was the only one in the house which could be considered in such a light. Several other chambers, 8, 13, and 15, had small openings in their west walls which probably functioned as ventilators, but they did not have a true deflector in association.

Room 5 was of still further interest because of the fact that its west wall had been reinforced by two poles set upright in the masonry. (Pl. 18, *b*.) The actual timbers were no longer present, having long since decayed, but their imprints were still plainly visible in the plaster which had surrounded them and the spaces provided for them in the masonry were quite in evidence. Although this feature was unique in the village here under consideration, it has been found elsewhere in the Southwest. Examples are to be seen in the Chaco Canyon, in Pueblo del Arroyo, at Aztec, and in various structures scattered along the San Juan.

Rooms 4 and 9 had been separated by a pole-and-mud partition. This was the only case of such construction found during the entire course of the summer's investigations. Just why such a wall should have been placed here and nowhere else in the two houses is not known. This difference in wall material is indicated on the plan (fig. 17) by dotted lines. The partition was no longer present in the ruins but the poles were plainly visible in the floor and large fragments of the plaster which had encased them were present in the débris. Rooms 4 and 9 had been destroyed by fire and the charred roof material was lying on the floor when they were uncovered. That this misfortune had fallen on the people during the occupancy of the building was suggested by the fact that a large number of pottery vessels were found sitting along the base of the wall in room 4 and culinary jars were in place in the fire pits in both 4 and 9.

Room 7 was of interest purely because of its unusual length and corresponding narrowness. There were no indications that it had

been used for living purposes. It is possible that its function was solely that of a storage chamber. The doorway between it and room 11 would have made it quite convenient for the people in that portion of the dwelling.

One point of contrast between houses A and B which should be mentioned is that of the doorways. House B had 18 which were open and one which had been blocked. There were only 7 in A and 5 of these were in the later sections. Both of those in the old original part of the building were inside openings and had been blocked early in its growth. Just what significance should be attached to this question of the doorways is debatable. It may be of no consequence whatever, and then again considerable importance may be attributed to it. As a suggestion, and this should be considered in the light of a postulation and not the statement of fact, attention may be called to a previous conjecture, namely, that the village was the result of a fusion of two groups of people, one coming from the general Chaco region to the north, the other from the Upper Gila to the south. (Pl. 2.)

The general introduction brought forward the idea that the northern centers felt the pressure of incoming marauders much earlier than the more southern communities. As a consequence the practice of making fortresses out of the dwellings probably was earlier in its development in those districts. This same condition contributed in some degree to the southern movement of northern peoples who no doubt carried their building habits with them. Granting such to be the case, the conditions in the village at the mouth of Red Paint Canyon may be interpreted as showing that the people from the north in building their dwelling, house A, adhered to the custom of providing few doorways, even though there may have been no actual necessity for such action in this district. On the other hand, the group from the south may have migrated before they had been subjected to any pronounced depredations and had done away with the custom of providing numerous doorways. In keeping with their habits, they erected a structure which contained a fairly large number.

The lack of circular ceremonial chambers in the block of the building, as well as their absence in the earth outside, presents another perplexing problem. It is rather difficult to explain why one group of people in a community should have built kivas while another failed to provide them. One reason which could be given is that the inhabitants of house B may have joined those in the large structure for the performance of their ritualistic observances. Such a practice would have obviated the necessity of constructing chambers of their own. It hardly seems in keeping with Pueblo custom, however, to think that such was the case. The small, more personal form of kiva usually accompanied each house or section

of a dwelling occupied by a special group or clan. There would not be as much likelihood of communal usage in their respective cases as in the large structures dedicated to major functions sacred to the entire village. Hence some other reason may have been responsible. It is possible that the builders of house B were not devotees of the circular kiva, having come from a region where present knowledge suggests that it was not a prominent feature in the dwellings. A rectangular inclosure of the room 5 form may have sufficed for their requirements. If such were the case it would appear that that particular chamber, as well as the similar ones in house A, may have had a definite relation to the rectangular type of kiva rather than that it was a prototype for the fraternity room as distinguished from the clan kiva. At any rate the occupants of house B did not build any of the highly specialized circular structures.

There was only one exterior fire pit associated with house B. (Fig. 17.) This is in some contrast to A, where a number were provided. The one example in this instance was located close to the southeast corner of the small court. It was roughly circular in form and was lined with stone slabs. The pit had an average diameter of 2 feet (60.96 cm.) and a depth of 1 foot 6 inches (45.72 cm.).

Close to house B, as well as in the vicinity of house A, there were a number of basins cut into the rocks which projected above the surface of the ground. (Pl. 1.) They averaged a foot (30.48 cm.) in diameter and ranged from 6 to 10 inches (15.24 to 25.4 cm.) in depth. At first it was thought that they were mortars of the type frequently observed in other parts of the country. Careful inspection of their rims and sides failed to show any of the wear which would result from the use of a pestle. Consequently it was decided that they must have been for some other purpose.

The first light shower of the season demonstrated their function. They were so placed that every bit of water which fell on the rock into which they were cut ran into the basin and was preserved. (Pl. 19, *a*, *b*.) In other words, they were small storage tanks.

The general character of house B with respect to its position on the top of a small knoll is clearly shown by the sections through the various rooms. (Fig. 17.) There was a slight slope toward the north and south from the central rooms in the back tier of the building. (Fig. 17, sec. *a*.) The middle portion of the structure did not show this to as marked an extent, although the floor in room 18 was lower than the others. (Fig. 17, sec. *b*.) The two rows at the front demonstrated a decided slope at the south end of the building. (Fig. 17, secs. *c*, *d*.) From west to east there was a decided slope through most of the rooms. (Fig. 17, secs. *e*, *f*, *g*.) Only the series 3, 4, 5 were practically on the same level. (Fig. 17, sec. *h*.)



a. View showing location of B with respect to A



b. Looking south across B

HOUSE B

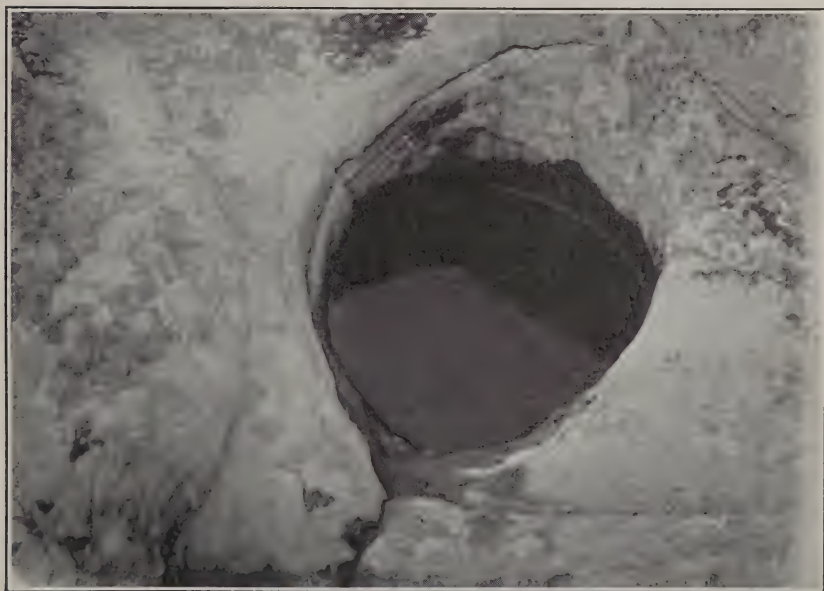


a. South end of building showing masonry

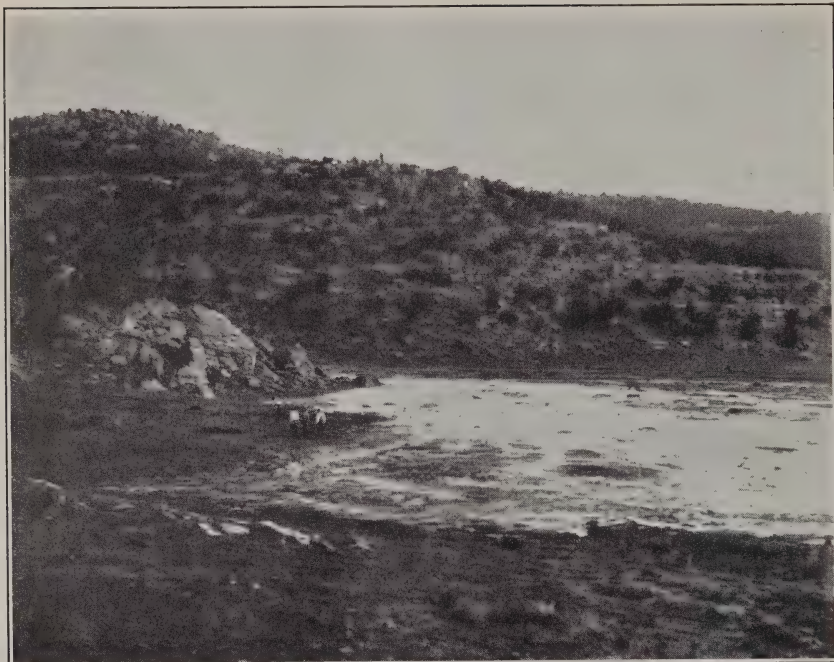


b. Interior of room 5

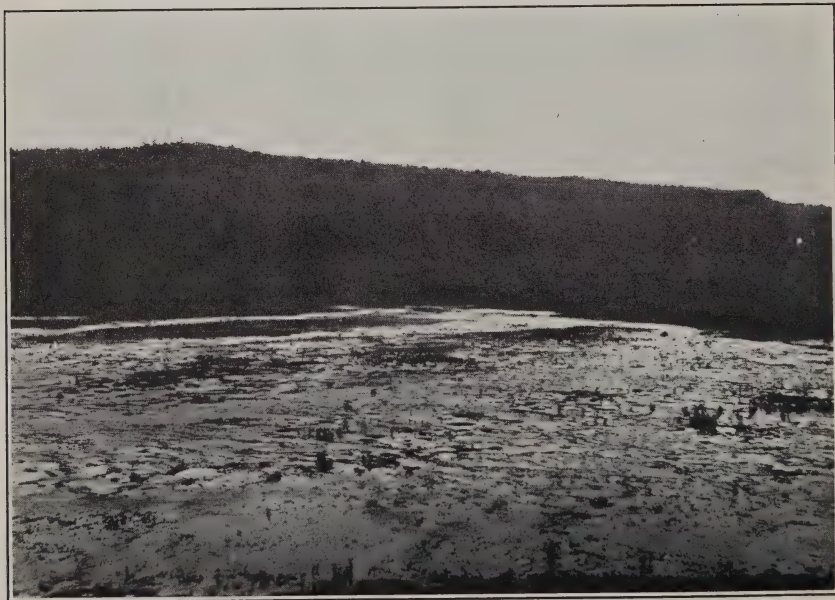
DETAILS OF HOUSE B



BASINS CUT IN ROCKS



a. Coming out of canyon mouth



b. Sheet spreading over valley bottom

FLOOD WATERS FOLLOWING A RAIN

There were two refuse heaps close to house B; one was located at its north end, the other at the south. The general practice in communities of this period was to pile the refuse to the east or southeast of the dwelling. To have done so here, however, would have placed the dump between the house and great kiva No. 2, a factor which possibly led to the use of two small mounds at each end of the building.

LOCATION OF FIELDS

The Village of the Two Great Kivas was ideally located from the standpoint of available crop land. Both Red Paint and Lonesome Canyons had comparatively broad, flat bottoms in which considerable planting could be done. Furthermore, there was a larger expanse of ground extending across Nutria Valley from the mouths of the tributary canyons which provided ample additional space for corn, bean, and squash fields.

Not only is the land well suited to planting, but it is so located that drainage water from both canyons spreads out in a thin sheet over a large part of it. As a matter of fact this feature may have played a large part in the choice of the site. It will be recalled that in the introduction mention was made of the location of most of the Zuñi villages, both ancient and modern, with respect to the terrain and the possibility of adding to the moisture obtained from precipitation by means of an overflow of water derived from the higher ground. The present site is a good example of this. Several times during the summer heavy rains brought down considerable flood water which spread out in a thin sheet over a large section of the valley just south of the ruins. (Pl. 20, *a*, *b*.) Although the water came down the side canyons with considerable force, it spread out near their mouths and formed an alluvial fan. There was no danger that fields placed there would be washed out or that the plants would be buried. This flooding occurred several times during the summer. The intervals at which the water came down were sufficiently frequent to warrant good crops. A similar amount of moisture in ancient times would readily have nourished a plentiful supply of vegetal products for an even larger community.⁴⁰

LESSER OBJECTS OF MATERIAL CULTURE

The lesser objects of the material culture of the inhabitants of the Village of the Great Kivas are represented by pottery vessels, stone and bone implements, ornaments made from the same materials, heads of unidentifiable animals carved in stone, a few charred

⁴⁰ For more detailed consideration of Flood-water Farming, see Bryan, Kirk, 1929.

fragments of basketry and fragments from a piece of textile probably used as an article of clothing. As will be noted from the list of articles secured from the excavations, the bulk of the specimens are objects made from imperishable material. Hence they present a one-sided picture of the arts and industries of the people. It should be borne in mind that there probably were an equal number of articles which, because of the material from which they were made, could at best have a very transitory existence. Clothing, sandals, baskets and various textiles, implements fashioned from wood, and other perishable substances decay very rapidly unless conditions are especially favorable for their preservation. It is only in rare instances that ruins located in the open, as these were, yield such specimens. Hence it is easy to fall into the error of thinking of the culture of such a site in terms of pottery, stone, and bone. Even though the other group of objects is characterized largely by its absence it should not be forgotten that they once existed and no doubt formed an important part of the commodities employed daily by the people. The nature of articles belonging to this group has been determined by finds made in cliff dwellings and dry caves. There a protecting layer of dry sand and an almost total lack of moisture has preserved them through the centuries. In describing the specimens from this site only half the story is told. The remainder, unfortunately, could not be retrieved by the investigations.

POTTERY

The pottery secured from the houses and burials consists of forms typical of one major period in Southwestern ceramics, namely, the classic or Pueblo III. A few sporadic pieces suggest survivals from the preceding phase, Pueblo II, but the majority are unquestionably characteristic of the great era. The vessels as a whole may be grouped under two main headings, culinary and nonculinary. This classification is not entirely satisfactory, because an occasional bowl or jar may have served in both capacities. But from a general point of view the grouping serves to facilitate description and discussion of the various forms. There was a marked tendency on the part of the potters to differentiate between the vessels which were to be used over a fire and those which were to serve solely in the capacity of containers. A jar intended for cooking purposes had a different composition from the standpoint of the mixture of clay which went into its manufacture from those which were intended for other purposes. Furthermore, the surface treatment is different. The culinary pots of the Pueblo III period are characterized by indented corrugations covering the entire exterior surface. This form of pottery is frequently called "thumbnail" or "finger marked." The non-

culinary group has smooth surfaces and some form of painted decoration. In the nonculinary group there are several types, including the well-known, widely distributed black on white; red vessels with a black decoration; polychrome wares consisting of red containers with designs in black and white pigment; buff or cream-colored jars and bowls with designs in red bordered by black; yellow or buff bowls with red interior and black ornamentation and red designs on the exterior. A very small number of red bowls present a polished or burnished black interior.

The containers in both groups of wares do not present a marked number of shapes; the culinary vessels in the main consist of wide-mouthed, globular-bodied jars. A second minor shape consists of handled vessels belonging to the pitcher class. In the nonculinary wares there are short-necked, globular-bodied water and storage jars, globular canteens, seed jars, pitchers, ladles or dippers, bowls, and mugs.

The culinary jars fall into two groups from the standpoint of shape, the main variation being that of the line of greatest diameter. In some instances this occurs at about the center of the vessel, while in others it is somewhat lower down on the side. A good example of the group with the greatest diameter at approximately the center is illustrated in Plate 22, *a*; the specimen next to it, Plate 22, *b*, is typical of the other group. As will be observed from Plates 21, 22, and 23, the general practice was to smooth a broad band around the rim. This extended down the side of the vessel a distance of 1 inch to 1½ inches (2.54 to 3.81 cm.). The rim on some examples has a pronounced outcurve, as in Plates 21; 22, *a*, *b*; and 23, *c*, *e*. On other specimens it rises more gradually from the sides of the jar to the lip of the orifice. (Pls. 22, *c*, *d*; 23, *b*, *d*.) There does not seem to be any correlation between the rim treatment and the body form. The sharply outcurved type is present on both the shape with greatest diameter near the center of the side walls and on that where the major circumference is farther down on the jar. The same may be said for the other style of rim.

The bottoms of the culinary jars are rounded; in no instance is a flat bottom to be observed. Some of the specimens, Plate 21 for example, have a tendency to a sharp rounding of the surface, while others, Plate 22, *a*, *b*, have a more gradual curve.

An occasional culinary vessel had small nubbin or lug handles placed on the exterior near the rim. On some there was just a single projection, while on others there were two. In the case of the paired nubbins they were placed at opposite sides of the jar. The lugs are just below the lip of the orifice in some instances and in others they are located farther down on the sides of the vessel. An example of the latter, also of the paired form, is illustrated in Plate 22, *c*.

There is some variation in the indented corrugation on the exterior surfaces of the jars. The vessels may be placed in three main groups on this basis. The largest number constitute a class characterized by continuous indented corrugation, as illustrated in Plates 21; 22, *c*; 23, *a*, *c*, *d*. The second group, numerically, is composed of jars on which the indentations occur in bands separated by smooth corrugation. (Pl. 22, *a*, *b*.) The third, represented by only a few specimens, comprises the vessels with indented corrugated upper portions and smooth bottoms. (Pl. 22, *d*, *e*, *f*.) As will be observed from the photographs, the indentations are not as finely made on these jars as on the examples in the other group. This is a characteristic more commonly found on the culinary jars of the Pueblo II period. The jar pictured in Plate 22, *e*, is structurally interesting because of the fact that it was made in two pieces rather than by the usual method of continuous coiling of the clay from the bottom to the top. The specimen shows clearly that the lower portion was made as a bowl and the neck then fitted to its rim. It was not a common feature at this locality, as only the fragments from one other jar showed a similar technique.

Vessels in this group were occasionally ornamented with appliqué decorations. These were fastened to the exterior while the clay from which the jar was made was still moist. (Pl. 23, *c*.) The appliqué figures took the forms of scrolls, volutes, undulating fillets suggestive of snakes, and turkey tracks. These figures were either placed well down on the side of the vessel or just below the rim, as in the example illustrated in Plate 23. Culinary jar ornamentation of this type had a comparatively wide distribution throughout the Pueblo area during the classic or great period. Kidder and Guernsey found it in northeastern Arizona.⁴¹ Holmes pictures an example from the Hopi country.⁴² Specimens of it were found on the Mesa Verde by Nordenskiöld and Fewkes.⁴³ Morris reports its occurrence both at Aztec and in the La Plata districts.⁴⁴ It was quite commonly used by the potters in the Chaco Canyon and Hough found a form of it on vessels from the Upper Gila.⁴⁵

Pitchers in the culinary group seem to have had the same body shapes as the larger jars, the main difference between the two classes being that of size and the presence or absence of handles. This conclusion is not based on complete examples because with the exception of a single miniature pitcher (pl. 26, *a*) this type of vessel is represented only by fragmentary specimens. The handles

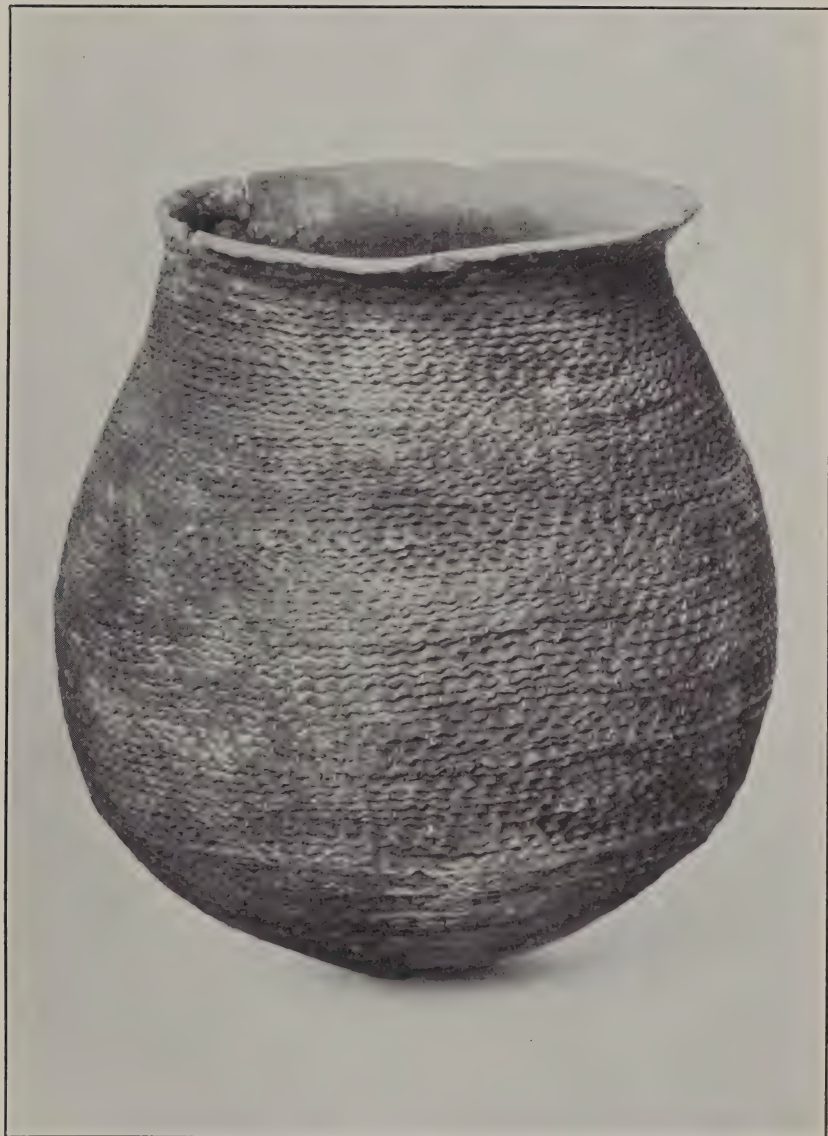
⁴¹ Kidder, A. V., and Guernsey, S. J., 1919, p. 142; pl. 58, *g*.

⁴² Holmes, W. H., 1886, fig. 252, p. 283.

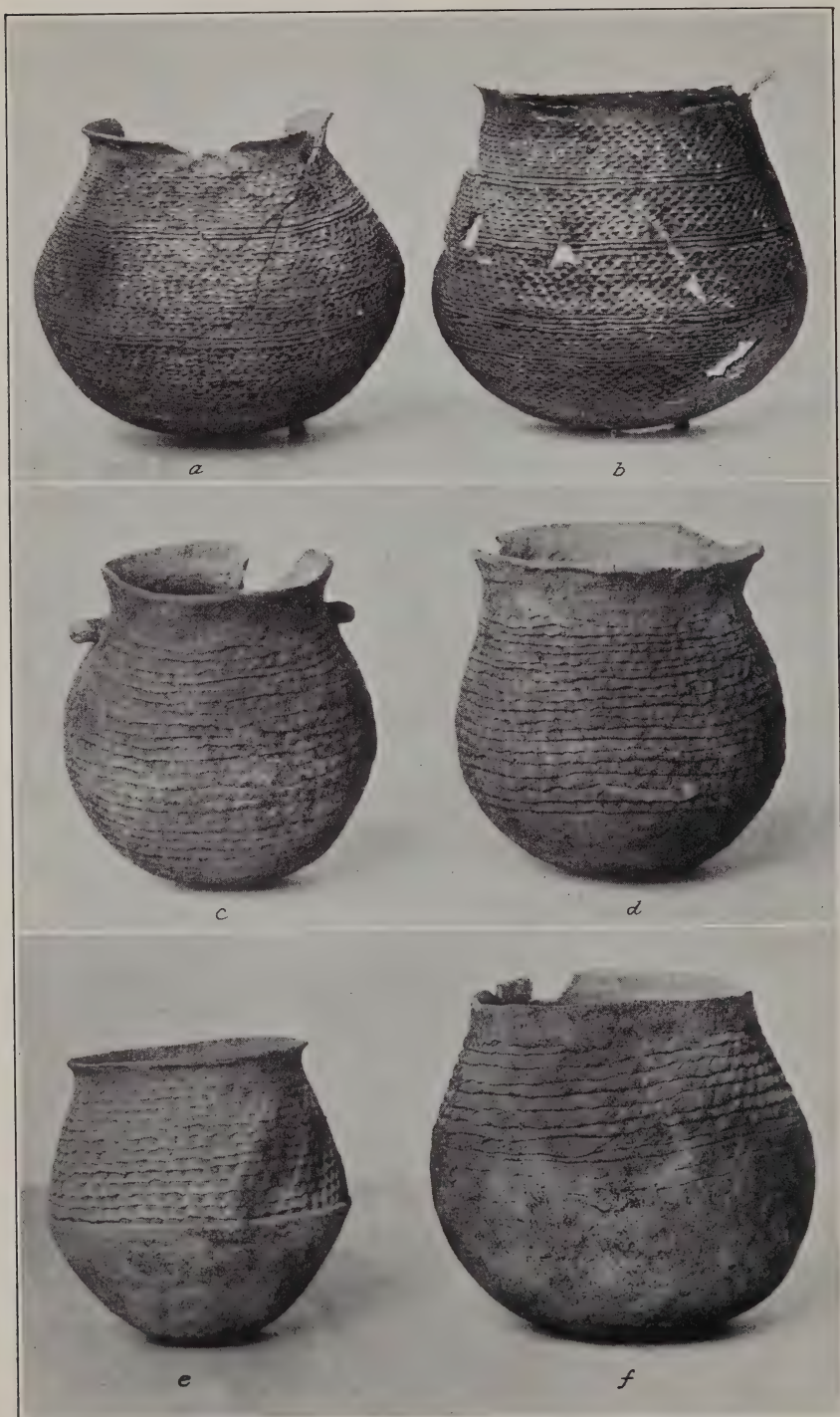
⁴³ Fewkes, J. W., 1911 *b*, pl. 23, *a*; Nordenskiöld, G., 1893, fig. 46.

⁴⁴ Morris, E. H., 1919 *a*, fig. 42, *a*; p. 71. 1919 *b*, pls. 38, *b*; 39, *b*.

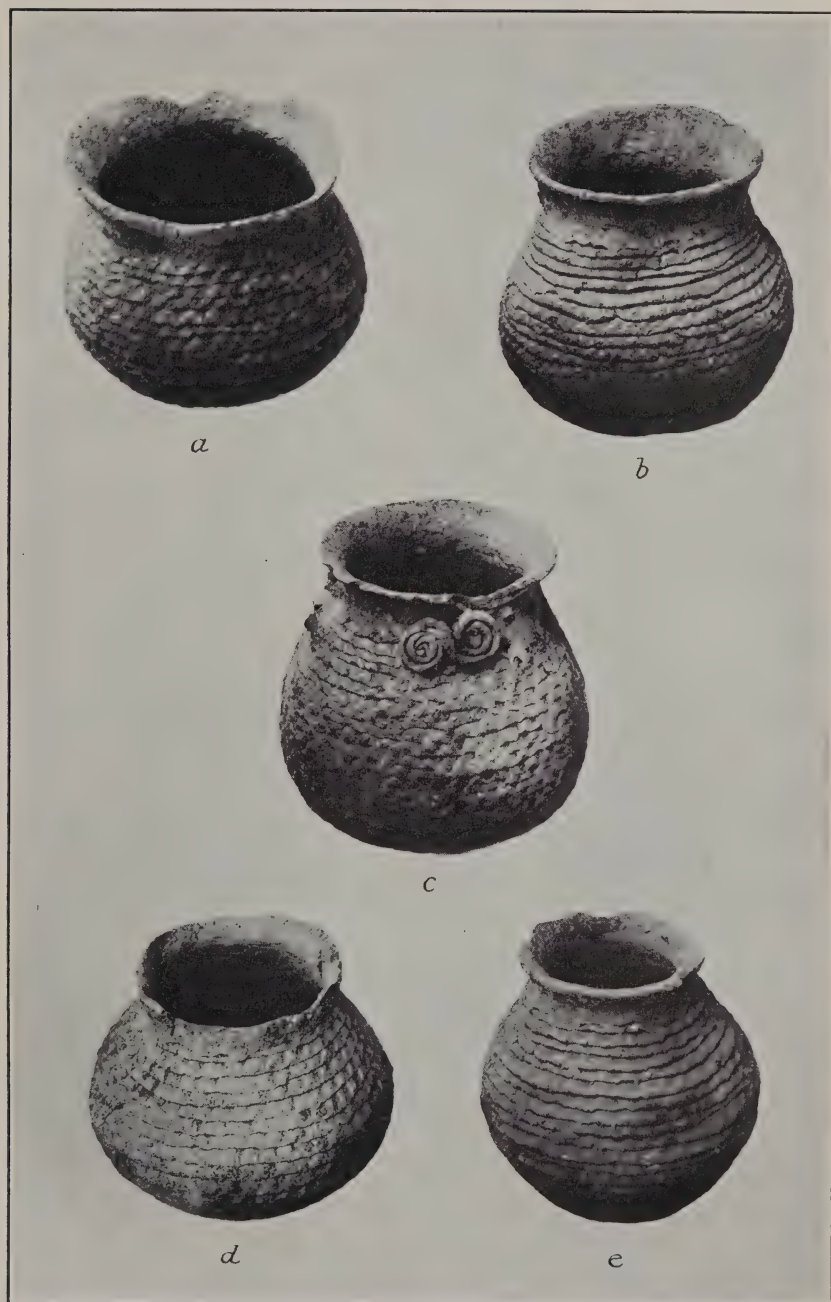
⁴⁵ Hough, W., 1914, pl. 6, no. 16.



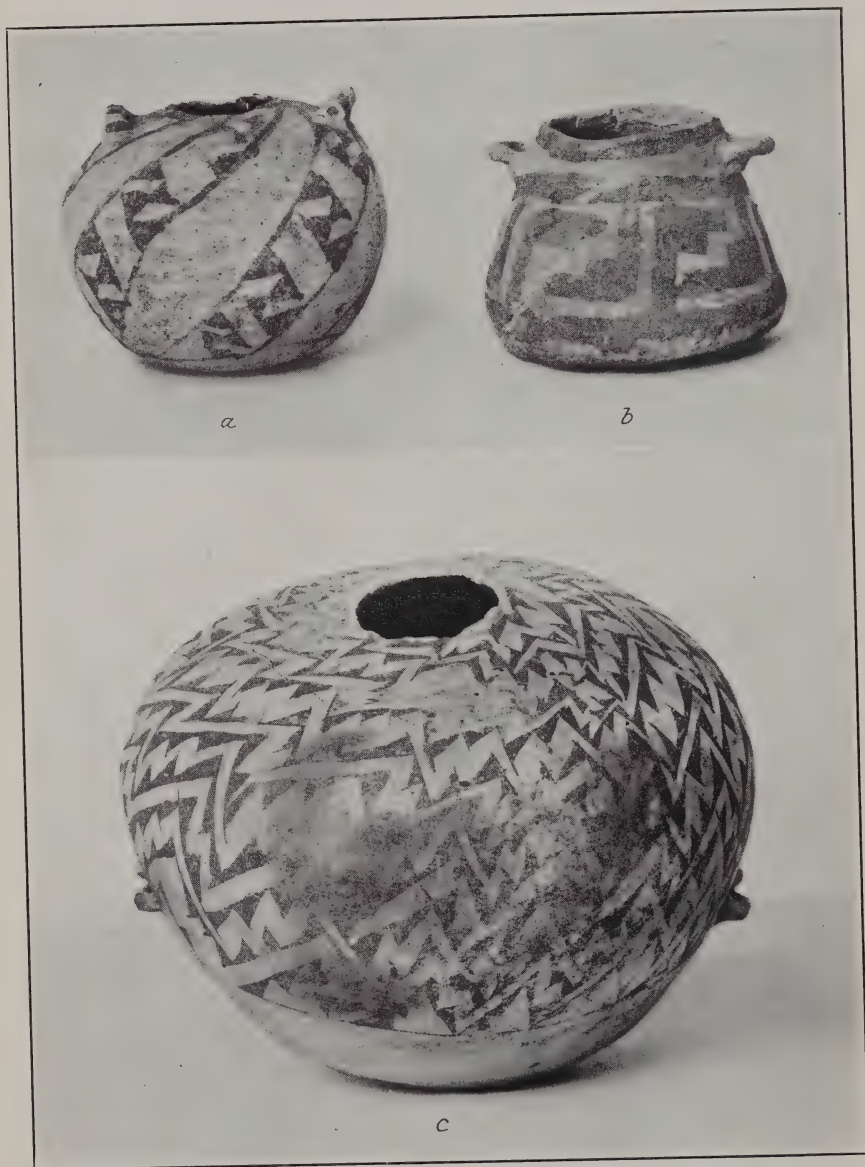
CULINARY JAR



VARIOUS FORMS OF CULINARY JARS



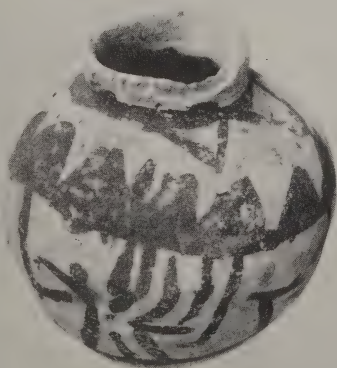
TYPES OF SMALL CULINARY VESSELS



BLACK-ON-WHITE POTTERY



BLACK-ON-RED VESSELS

*a**b**c**d**e**f*

MINIATURE PITCHERS AND JARS

consist of single, double, and triple fillets of clay. When more than one fillet was used the common practice was to place them side by side. Sporadic examples are found, however, where the strands were twisted around each other or braided. The handles extended from just below the lip of the orifice to the shoulder, or region of the greatest circumference of the vessel. In a few instances the top of the handle was flush with the lip, as in the case of the miniature pictured in Plate 26. This was not common if the handles and fragments found are a criterion for the group. Evidence shows that the handles were fastened to the pitchers, during the process of manufacture, by the riveting method; that is, when the body of the pitcher was completed and the handle fashioned holes were punched through the side of the vessel at the points where the upper and lower ends were to be attached and the extremities were placed in the perforations and smoothed down on the inside and blended with the wall of the container. The outside edges of the holes were pressed around the handle and the joints carefully smoothed. The vessel was then ready for the drying and firing process.

There is a greater variety of forms in the vessels comprising the nonculinary group. The black-on-white and various colored wares might logically be considered as separate groups, but for a consideration of shapes it will suffice to deal with the painted wares as a unit. The larger water or storage jars, both in the black-on-red and black-on-white, are of the typical globular form found in Pueblo III throughout a greater part of the area. The main body of the vessel is well rounded and there is a slight tendency to a flattening of the upper portion around the neck. The latter is short and squat, with a restricted orifice. Plate 24, *c*, is a good illustration of the body form in this type of vessel. Unfortunately the neck was broken off, while it was in use by some of the inhabitants of the village, and the edges of the fracture smoothed down. Consequently the nature of the neck is not shown. It probably was similar to those on other jars, such as depicted in the outline drawings, Figures 19 and 20.

The handles on the large jars are of several different varieties. The commonest form is that of a single loop or flat band placed well down on the sides of the vessel. An occasional handle of this type shows that it was fashioned from two fillets rather than one. Another handle which seems to have been rather extensively used might be considered a variation of the first form. It consists of a single loop or fillet which had the central portion pushed in and welded to the side of the jar so that at first appearance the handle suggests that two small loops has been placed side by side. The jar, Plate 24, *c*, has handles of that type. Another group of jars is characterized by indented handholds. These were made while the vessel was being fashioned by pushing in a small area in the side of the jar. Handles

of this nature, if they may be designated as such, were very common in the Chaco Canyon.

Canteens or small water bottles are represented in the collection only by black-on-white vessels. Containers of this group are characterized by full globular bodies and small necks with restricted orifices. Plate 24, *a*, illustrates the body shape for this group. The neck has been broken off of this vessel, but indications are that it was similar to the one illustrated in the drawing, Figure 21, *a*. Canteen handles were of two forms, one type consisting of simple loops placed at opposite sides of the orifice as in the case of Plate 24, *a*. The other handle style has mushroom-headed lugs placed in a similar manner. (Fig. 21, *a*.) Judging from the canteen fragments and number of lugs found during the digging the latter was the predominant form.

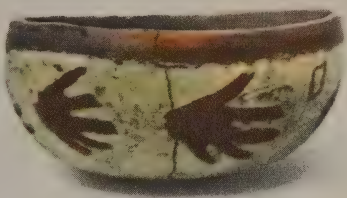
Seed jars are not numerous in the collection. The black-on-white form of this type of vessel has a rounded bottom with distinctly depressed top. (Fig. 22.) In the black-on-red series the bodies are more globular and the tops only slightly depressed. (Pl. 25, *b*.) The orifice in both the black-on-white and black-on-red groups tends to be comparatively small. One black-on-red specimen, however, has a wide orifice with a distinct rim. The latter might even be called a squat neck. (Pl. 25, *a*.)

Pitchers have full globular bodies and tall necks. The necks are of two forms. One group is characterized by sides which rise obliquely from the shoulder to the lip. (Pls. 27, *d*; 28, *b*, *e*.) The other type has vertical sides rising from the body to the orifice. (Pls. 27, *e*; 28, *a*, *f*.) Occasionally there is a slight outcurve just below the rim. (Pl. 28, *d*.) Handles are of the round flat or effigy form. They are attached to the neck below the rim and join the body at the shoulder. The effigy type of handle (pl. 28, *f*) is one which occurs quite frequently on vessels from the Upper Gila region. Occasional examples of it are also found in the Chaco Canyon wares.

Ladles or dippers are all of the bowl-and-handle type. (Pls. 29, 30.) No example of the half-gourd or scoop forms were found, and there were no fragments to indicate that such had been made in the village. One specimen (pl. 30, *a*) suggests a modified survival of the form in that it has a concave handle. The bowl portion of the object, however, is separated from the handle by a clay partition. The handles on the smaller ladles are solid, but the larger examples have the hollow tubular variety. The ends of the handles were treated in a number of ways. In some instances they were bifurcated, in others a small hole was punched through the clay. (Pls. 29, *c*; 30, *c*.) Still further examples show that a small strand of clay was pulled out from the end and doubled back onto the top of the shaft. (Pl. 30, *b*.) A number of the hollow tubular



a



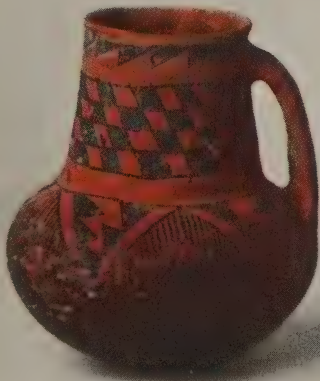
b



c



c



d



e

handles contain objects which rattle when the dipper is shaken. This is a feature commonly found in pottery of this form. It may be attributed to the small pellets of clay punched out of the handle when perforations were made (pl. 30, *c*) in it, presumably to prevent its cracking during the firing process. A number of broken handles show that they were molded around a stick. The latter apparently was left inside and disappeared as a result of the firing process which fixed the object in its permanent form. This raises the point as to whether or not the holes punched in some of the handles might not have been for the purpose of allowing the wood to burn out. This is especially true of examples where the holes were cut out rather than punched in. The perforations could easily have served a double purpose of air vents and allowance for the expansion and contraction of the clay during the baking process. Broken sections from ladle bowls show that the handles were attached by the riveting method.

Bowls fall into two general groups from the standpoint of shape. One is the hemispherical, in which the height and half the diameter are approximately the same; the other, a group of shallow containers in which the height is appreciably less than half the diameter. There are more of the latter in the black-on-red polychrome series than in the black-on-white. (Pl. 31, *a, b*.) The rims on the bowls are of two types. The commonest form has a direct rounded or slightly flattened lip. The other, not numerically large, has a slight outcurve with a beveled edge. (Fig. 18.)

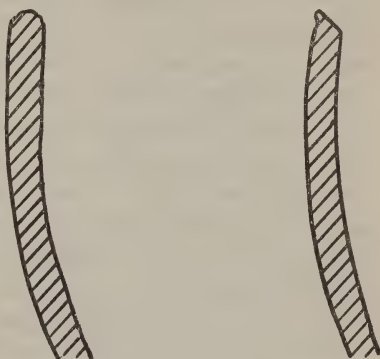


FIGURE 18.—Bowl-rim shapes

Mugs are represented only by fragmentary specimens. Judging from the pieces, in some cases more than half the vessel, they are all of the characteristic Proto-Mesa Verde type.⁴⁶ As a matter of fact the vessels are typically Proto-Mesa Verde in character and may well be trade pieces from villages belonging to that culture.⁴⁷

From the standpoint of surface treatment the nonculinary wares present some interesting features. All of the black-on-white vessels have a slip. That is, after the container had been smoothed during the process of manufacture, while the clay was still moist, it was then dried and a wash of "liquid clay" applied. The latter consisted of a saturated solution of water and clay to which a light coloring substance, probably kaolin, had been added. When this

⁴⁶ Kidder, A. V., 1924, pl. 27, *a*.

⁴⁷ Kidder, A. V., 1924, pp. 65-68.

had dried it was rubbed with a polishing stone until a smooth surface was obtained. This produced what is called the slip. The light-colored surface on the black-on-white vessels varies from a dull slaty gray to a chalky white. This in large measure seems to be correlated with the quality of the slip. Where the latter is thin the gray base color of the vessel shows through and detracts from the lightness of the surface wash. The pigment in the decoration ranges from a brownish black to a good black. This may be attributed to the firing process. When a vessel was properly baked the design came out a good black, but if there was a tendency to overfiring the brownish-black hue resulted. A majority of the vessels indicate that a mineral pigment was employed in painting the design. A few examples, however, show that a form of carbon paint was used.⁴⁸ Mineral pigments in designs are one of the characteristics of the Chaco Canyon ceramic industry.

The black-on-red wares owe their base color to the use of a slip containing pigment of the desired hue. The general shade in this group tends to a maroon and not a clear red. The paste or material in the walls of the vessels ranges from a gray to cream or buff color. The texture is rather coarse, due to the mixture of sand and ground potsherds used as a binder or temper in the clay. The designs were painted in a dull black and were applied to the surface after it had been polished. This form of red ware is represented largely by bowls, although an occasional pitcher or large jar seems to have been made. It is one of the types of red ware commonly called "Little Colorado," which had a wide distribution throughout the central portion of the Pueblo area.

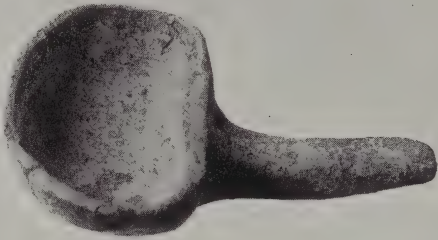
A second form of colored ware which, strictly speaking, is a polychrome, is closely related to the type just described. The slip color varies from maroon to bright red, with an occasional specimen suggesting a slight orange shade—the latter being decidedly rare, however, in this collection. The design is painted in a good black and on bowls there was an exterior decoration in white. (Pl. 31, b.) This also is in a form commonly called Little Colorado and seems to have been a development from the earlier type. In addition to the white on the exterior, these vessels differ from the plain red in that the surface polish was applied over the decoration. Bowls belonging to this kind of polychrome ware were first given special attention as a result of Doctor Hough's work in the Little Colorado region, particularly in the section south and southeast from Holbrook, Ariz., 30 years ago.⁴⁹ Specimens of that variety of Little Colorado ware have been found at the Mesa Verde, in the Chaco Canyon, along the Rio Grande, and in northern Mexico. It had a

⁴⁸ Hawley, Florence M., 1929.

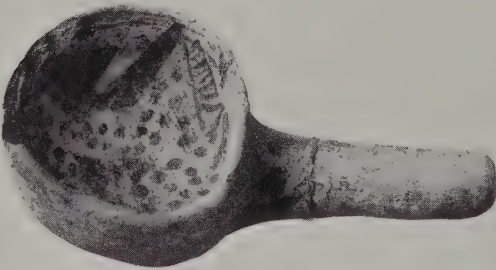
⁴⁹ Hough, W., 1903, pls. 35, 46, 63.



BLACK-ON-WHITE WARE PITCHERS



a

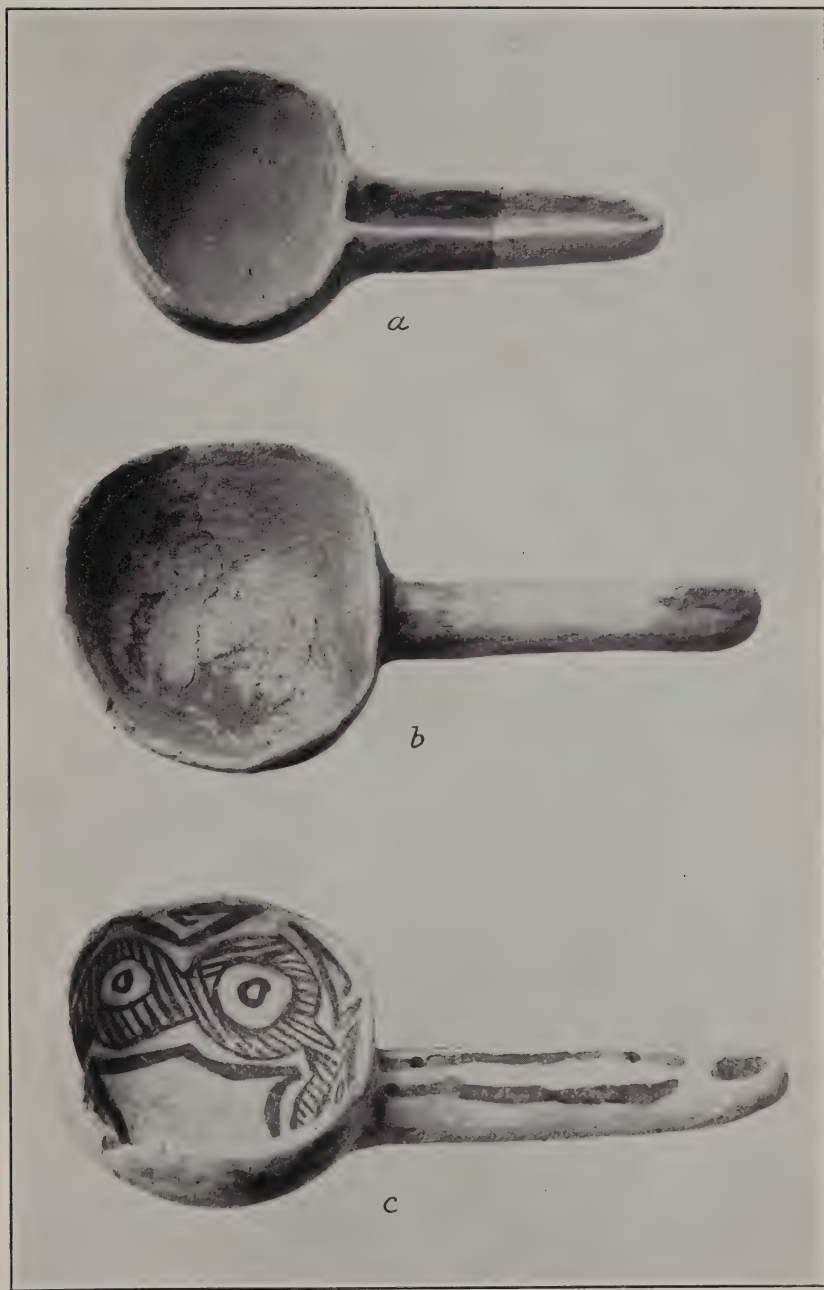


b



c

BLACK-ON-WHITE LADLES



LADLES, BLACK-ON-WHITE GROUP



a



b



c

POLYCHROME BOWLS

wide and far-reaching distribution, and is the type most commonly associated with the term "Little Colorado."

A distinct type of polychrome consists of vessels, bowls especially, on which the three-color effect was obtained through the use of two slips, one red, the other a light cream color. The interior of these vessels is red with a black decoration. On the exterior the light slip, probably white but assuming a slightly off-tone cast because of the red underlay, was applied from a line some distance below the rim. A decoration was then painted with slip paint such as covers the interior of the vessel. (Pl. 27, *a*, *b*.) The locale of pottery of this nature has not been determined, but indications point toward the reaches of the Salt River to the southwest. One of the examples (pl. 27, *b*) is almost identical with a vessel found at Elden Pueblo, near Flagstaff, Ariz., by Doctor Fewkes. Both of these specimens suggest that they were copies of a style of ornamentation to which the potters were unaccustomed rather than true examples of the type. A further development of this style of surface treatment is illustrated by the small jar, Plate 27, *c*. In this case a light-colored slip was applied over a red vessel. Then the decoration was painted, first in black, then in red. This produced a very pleasing polychrome effect. The design would have been even more striking had the black been outlined in red rather than painted over and the second color allowed to extend beyond the borders of the first. This jar also suggests a polychrome found in the Salt River district and might be considered a possible prototype for the Gila varicolored pottery.

Another form of polychrome ware, represented only by bowls, in general appearance is quite similar to the form described in the preceding paragraph. The technique used in their manufacture was quite different, however. Instead of a light-colored wash forming the background for the decorations on the exterior, no slip at all was used. The base or paste of the vessels is a buff or orange in tone, and the exterior ornamentation consists of designs painted with the slip mixture used on the interior, the latter simply being continued from the edges of the band around the rim. This band resulted from the practice of carrying the interior slip over the lip and down the outside wall for a short distance. (Pl. 31, *c*.) Occasionally a circular space in the bottom of the interior of these bowls was left without a slip. The walls were treated with a coating of the pigmented surface wash and the design painted in black. The effect produced by such an interior is striking. The material in the walls of the containers in this group is coarse and friable. The tempering material or binder mixed with the clay consists of ground rock and potsherds. Whether this form of polychrome de-

veloped as the result of influence from the Salt River potters or vice versa is a problem which can not be solved until more information is available on both groups. The type has been known for many years as Houck ware, because the first examples of it to come to the attention of students were found in the vicinity of that Arizona town. Future investigations may show the nucleus to be elsewhere and the present designation of it a misnomer. In so far as this site is concerned, it was the oldest polychrome. It occurred in the lowest levels of the dump heaps and the refuse-filled rooms of house A, while the other forms appeared well toward the tops of the deposits.

The red pottery with burnished or polished black interior is represented in the collection by only two specimens and a number of fragments. The lack of an appreciable amount of this type suggests that the few pieces found were importations and not locally made. This kind of ware is very common in the sections of the Little Colorado to the west and might easily have been carried to this village. The paste in the vessel is very coarse and sandy, and the edges of the potsherds have a marked tendency to crumble. The black is good and has a slight luster. The exterior color ranges from dark red to maroon.

DESIGNS ON THE PAINTED POTTERY

The decorations painted on the nonculinary vessels were placed on the exterior of large jars, pitchers, seed jars, canteens, and mugs; and on the interior of bowls and ladles. None of the black-on-white bowls or ladle bowls have an exterior decoration, but in the case of the black-on-red and polychrome vessels it is common. The same elements of design and type of decoration were used indiscriminately on all the varieties of nonculinary pottery. This feature is so pronounced in the collection that it is practically impossible to tell from the design itself whether it came from a black-on-white or colored container. The main elements used in the decorations consist of solid and hachured figures. On some specimens solid patterns were used exclusively; on others there is only the hachured form of ornamentation. Additional vessels have combinations of the two placed in contrasting and balanced order. On bowls the majority of the patterns are of the band variety. A smaller proportion are characterized by an all-over design, and a few examples have a quartered style of decoration. On the large jars the ornamentation extends from the neck over most of the body; in fact, only a small area at the bottom is unpainted. The necks on these vessels present an additional zone of decoration and are embellished by a series of repeated figures. The canteens and seed jars are decorated with patterns extending from the neck or orifice over a major portion of

the body. Pitchers have two forms of decoration. One style separates the vessel into two main zones, the neck and the body. The other treats the vessel as a whole. The mugs were painted with a broad band design, extending around the central portion of the body, bordered by heavy framing lines above and below.

An example of a balanced design composed entirely of solid figures is shown by the jar, Plate 24, *c*. This form of decoration was so widespread in its distribution that it is difficult to assign it to any one group or district. Similar examples have been found along the San Juan, in the Chaco, and at many Little Colorado sites.

The method of combining solid and hachured figures to form a pleasing decoration is illustrated by the drawing, Figure 19. The main elements in this design are interlocking frets, a form of pattern widely used during the Pueblo III era. The hachured portion is particularly interesting because it illustrates a combination of two styles. The characteristic hachure of the Chaco Canyon wares is marked by the use of oblique composing lines and that of the Upper Gila by lines running parallel to the borders of the figure. In the decoration on this jar both forms appear. This illustrates a point mentioned previously, namely, that in some instances there apparently was a fusion between two styles of ceramic art. The rectilinear fret figures repeated around the neck of the jar are common on vessels of this type. A variation frequently found has an interlocking feature, so that the design forms a continuous band. A fragment from such a vessel bearing that type of ornamentation was found by Hodge during the course of his excavations around the circular kivas which he uncovered near Hawikuh. Portions of other large jars from that site bear combination hachured and solid decorations very suggestive of that depicted in Figure 19.⁵⁰



FIGURE 19.—Pattern on black-on-white jar

The pigment on this specimen was applied after the vessel was polished and has a brownish-red hue as the result of overfiring. Potsherds from black-on-red jars found in both A and B houses in the Zuñi Reservation village show that similar designs were employed on that group of vessels. The combination of opposing hachured and solid elements seems to have been a favorite red-ware

⁵⁰ Hodge, F. W., 1923, pl. xx.

pattern. It is significant, however, that the hachured portions are of the Upper Gila and Little Colorado form rather than that of the Chaco Canyon.

A typical Upper Gila black-on-white jar decoration is shown in Figure 20. On this vessel it will be noted the hachure lines in the triangular elements run parallel to one side of the figure and that the long connecting arms are filled with parallel rather than oblique hachuring. The "eye" spots in the solid triangles are typical. This design as a whole may be considered another example of an interlocking fret pattern. The decoration on the neck is very simple, consisting as it does of a series of units composed of three short parallel lines. The pigment on this vessel has a soft, lustrous appearance which is obtained only by polishing over the design. In this respect the example is in distinct contrast to the preceding.



FIGURE 20.—Black-on-white jar decoration

active, was quite common in the upper Little Colorado region and to some extent in the Salt River district. The band of interlocking fret figures around the neck of this jar illustrates clearly that element in decoration.

Canteens were found only in the black-on-white wares. The designs ran largely to solid elements; as a matter of fact, no examples of a hachured decoration were observed on any of the fragments from vessels of this type, nor do any of the whole specimens have it. On one example a series of six oblique bands was placed on the body of the container, extending from the neck to a line drawn around the walls just above the bottom. The chief element employed in each band was that of a series of solid triangles. (Pl. 24, *a*.) The surface finish on this particular vessel is very rough and the slip unusually thin. As a consequence, the background for the decoration is not all that might be desired. The design itself was slovenly done, and

The polychrome jar, Plate 27, *c*, with its combination black and red decoration presents another example of the interlocking fret style of pattern; also of a balanced solid design. The decoration was so spaced and placed that a 7-pointed star was formed around the orifice. This is apparent only when one looks directly at the top, as shown in Plate 27. The use of star figures, both positive and negative,

although the pigment is a fairly good black the canteen is not striking in appearance. The general effect is that of the work of a beginner. An example of the use of broad, heavy lines in a fret motif is illustrated by the drawing, Figure 21, *a*. In this case four figures were placed around the upper part of the body of the canteen. No ornamentation was placed on the neck. Whether or not the mushroom-headed handles bore some form of decoration can not be answered, because the top portions are missing. Handles of this form found scattered through the refuse heaps were observed to be decorated. The ornamentation usually consisted of a simple figure on the upper portion or top. A circle, dot, cross, group of small dots, spiral, or series of concentric circles were the elements generally employed.

The vessel, Figure 21, *b*, is a curious cross between a seed jar and a canteen. The bottom portion has a typical seed-jar form, as far

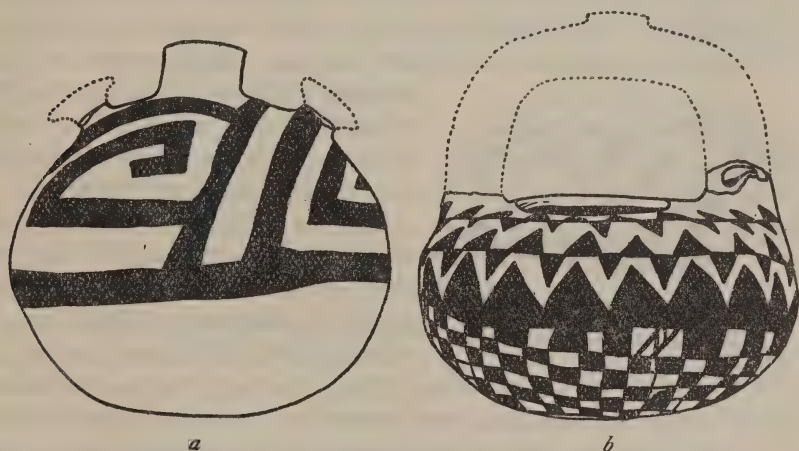


FIGURE 21.—Canteen and stirrup-handled jar patterns

as the black-on-white vessels are concerned, but in addition there originally was a hollow loop handle of the stirrup type, as indicated by the dotted line in the drawing. This had been broken off prior to the object's use as a mortuary offering and could not be found. For this reason the shape and height of the handle are merely postulated, as is also the orifice and short, squat neck at its top. Vessels of this type are not unique in the Southwest, although they are not found in any great numbers. During the course of his investigations in the circular kiva group near Hawikuh, Hodge found an example in the black-on-white wares. This specimen, however, did not have an orifice in the upper part of the body, such as the present, and may truly be called a canteen.⁵¹ Fewkes obtained a somewhat similar vessel in colored ware while excavating in the Chaves

⁵¹ Hodge, F. W., 1923, Pl. xxviii, c.

Pass region in Arizona.⁵² The form is also known along the Upper Gila, as well as in the Chaco Canyon.

The design on the vessel pictured in Figure 21, *b*, is an interesting illustration of the extent to which solid elements may be used. The lower portion of the body from approximately the line of greatest diameter to the bottom is covered with a checkerboard pattern, while on the upper half solid triangular elements prevail. The top part of this decoration is very suggestive of the ornamentation on one of the black-on-white seed jars. Triangles resting upon and pendent from lines drawn around the walls of a vessel are very common in the decoration of the black-on-white group, especially in the northern parts of the Pueblo area, although they were more prevalent in the earlier stages of ceramic development than in the classic and early historic phases. The checkerboard pattern is one which was employed over a large portion of the Southwest, but its area of greatest popularity seems to have been in the eastern portion of the Little Colorado region and in the Chaco Canyon. As a matter of fact,



FIGURE 22.—Seed jar decoration

present evidence indicates that the checker motif attained its major importance in the range covered by the eastern phase of Pueblo I.

Seed jars in the black-on-white series were ornamented in the main with variations of the solid type of decoration. The example referred to in the discussion of the

preceding vessel is illustrated by the drawing, figure 22. Other favorite patterns, judging from numerous fragments, consisted of variations of the fret design, and an occasional example showed that a band of checkerboard had been placed around the body. There were so few seed jars represented in the material obtained at this site, however, that it is not advisable to draw definite conclusions with respect to this group.

Black-on-red seed jars were consistently decorated with designs of the combination solid and hachure style. (Pl. 25, *b*.) The decoration on the vessel just referred to is typical. It is interesting to note that the hachure is of the Chaco style, a characteristic noted in all cases in this group. As in the case of the black-on-white, there were not many specimens of this shape in the black-on-red and none in the polychrome pottery. The general character of the vessels in this group is similar to that of the black-on-red bowls. The slip is a dark maroon color, and the black pigment was applied after the surface was polished.

⁵² Fewkes, J. W., 1904, Pl. xxixi, *b*.

Pitchers show somewhat more diversity in decoration than do some of the vessels just described. Solid, combination solid and hachure, and straight hachure constitute the main patterns. A good example of a design composed entirely of hachure is illustrated by the specimen, Plate 28, *b*. This is a characteristic Chaco Canyon decoration and depicts the form of treatment in which the neck and body of a vessel are regarded as a unit rather than two distinct zones. The pattern and shape are typical of the middle period in the ceramics at Pueblo Bonito in the Chaco Canyon. Examples of combination solid and hachure designs are depicted by *c* and *d*, Plate 28. Both of these vessels received the zone treatment. Around the necks are fret symbols, while the bodies have contrasting solid and hachured figures. In one case the pattern is a variation of a complicated interlocking fret motif similar to that on the large black-on-white jar, Figure 19. It, too, has both the Chaco and Upper Gila styles of hachure combined. Unfortunately, the vessel is weathered to such an extent that the ornamentation is difficult to see, particularly in the photograph. The second vessel has a simple pattern composed of alternating solid and hachured bands. Some variation was provided by the two rows of dots, one separating the lowest hachure and solid band, the other encircling the bottom solid line. Although the hachure is of the Chaco Canyon form, the decoration as a whole, as well as the shape of the vessel itself, is more suggestive of the Upper Gila wares.

Solid designs are illustrated by *e* and *f*, Plate 28. On both of these specimens the field for decoration was separated into zones. On *e* the neck was treated as one and the body as another. Three sections were marked off on *f*. The neck constituted one, the shoulder another, and the region of greatest body diameter the third. Both decorations are characteristic of the solid patterns found throughout the eastern Little Colorado district. The zoomorphic handle of *f*, however, is highly suggestive of the Upper Gila pottery. Two more examples of the solid design are illustrated in Figure 23. The first has a double-zoned decoration. As in the case of some of the other specimens, the neck has a different design from that on the body. The predominant element in both parts of this decoration is a solid triangle, the different ways in which it was used resulting in a fairly complex pattern. In the band around the neck opposed stepped figures composed of two triangles were placed in alternation, one pendent from the top framing line, the other rising from the bottom of the band. The tips of the smaller triangles in each touch, so that a single symbol is suggested. Three of these figures constitute one unit of the design, and there are three such units in the band. Separating them are two sets of four parallel lines. The

space where the third group of lines would normally fall is filled by the handle. The band around the body of the jar consists of two rows of opposed triangles separated by a series of dots. This pattern, except for the dots, is almost identical with the upper portion of that on the seed jar, Figure 22. The second decoration, *b*, Figure 23, is a continuous decoration covering the neck and body. It does, however, separate into two units, one of which surrounds the neck and the other the body. The main motif is that of the interlocking fret. On both of these examples the pigment is a clear, sharp black, applied to the surface after the vessel was polished. Both pitchers are suggestive of the Little Colorado black-on-white from the region south of Holbrook.

Typical designs for pitchers of the black-on-red series are illustrated by the two specimens, Plate 27, *d*, *e*. The first has two main zones like some of the black-on-white vessels. In this instance the

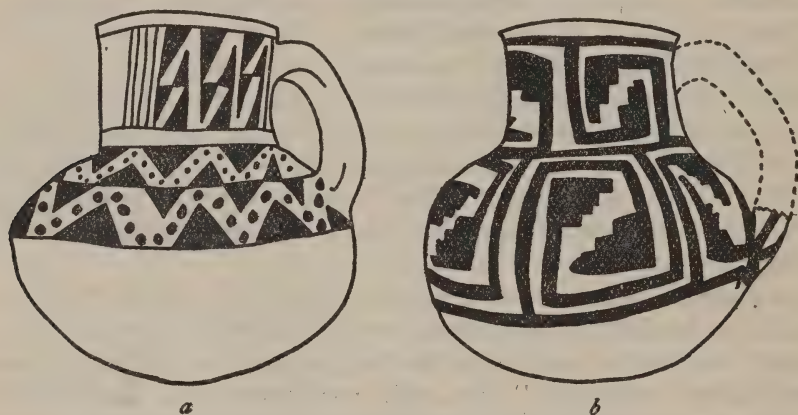


FIGURE 23.—Designs on black-on-white pitchers

decoration around the neck is in two parts, namely, the band of pendent triangles just below the rim and the checkerboarding on the central portion of the neck. The band around the body of the vessel consists of contrasting solid and hachure figures, the hachure again being of the Chaco Canyon variety. The design on the second pitcher (pl. 27, *e*) is made up of simple elements, yet presents a rather complicated appearance. It is composed of three bands, one around the upper portion of the neck, the second encompassing the lower half of the neck and the shoulders, while the third surrounds the body. The top band consists of three broad, heavy lines, parallel with the rim on each side of the neck, extending from the handle to a unit of checkerboard pattern at the front of the vessel. This same type of figure is present in the decoration on a number of black-on-red bowls and seems to be quite typical in the region between the Puerco and Little Colorado Rivers. The second

band has alternating rows of parallel lines and solid triangles. The row of triangles at the base of the neck has a single framing line connecting the apices and another the bases. Above the unit composed of the triangles are two bordering lines. Between the lower framing line of this group of triangles and those comprising the band around the shoulder are four parallel lines. The bottom row of triangles is also framed by lines connecting the tops and bottoms. The band around the body of the vessel consists of a series of oblique panels composed of opposing rows of triangles whose apices touch and, as a result, produce negative diamond-shaped figures. Each of these panels is separated by a series of three oblique parallel lines. The pigment in the design is a soft, lustrous black, which was polished over, and as a result appears to have sunk into the paste. Judging from museum specimens and potsherd collections, this is a typical Little Colorado vessel of the kind found in the region from Holbrook south to Showlow and east into the drainage of the Puerco of the west. This particular specimen is the only one which has a decoration painted on the bottom. The latter is very simple, however, consisting as it does of a circle quartered by two lines intersecting at approximately the center.

Pitcher handles in both the black-on-white and black-on-red wares in a majority of cases bear some form of ornamentation. The latter in general is quite simple. It may consist of a series of parallel lines running lengthwise with the long axis, cutting obliquely across it or at right angles to it. An occasional specimen has a single fret or spiral figure. Other examples were ornamented by a strip of checkerboard. Only one zoomorphic figure, an indeterminate quadruped, was observed.

Mug fragments indicated that the decorations had been of the typical Proto-Mesa Verde variety. That illustrated in Figure 24 is characteristic. The main band around the center of the vessel, composed of solid and hachured elements, illustrates one common form of design for this group. The use of heavy, balanced bordering lines above and below the main band is one of the traits normally present in Proto-Mesa Verde decoration. The design on the handle of this mug (fig. 24, *b*) is also characteristic.

Bowl decorations partake of the same general nature as those on the other containers. There is some variation, however, due to the form of the field on which the decoration was applied. The commonest style of bowl pattern in the black-on-white wares was that of the band. All-over and quadrate designs are less prevalent in the group of specimens. Typical examples of band designs are illustrated by the bowls *a*, *b*, *c*, and *e*, Plate 32, and *a*, *b*, *c*, *d*, and *f*, Plate 33. The chief elements in the decoration of *a* and *b*, Plate 32, are inter-

locking frets. Those in *b* are somewhat more elaborate than *a*, but the general character of both is the same. The ticked or dotted rim of *b* illustrates a feature common to a certain group of wares in the Chaco Canyon and one which is typical of the Mesa Verde and Proto-Mesa Verde ceramics. The present example is more closely related to the Chaco Canyon form of pottery. Four similar yet not identical fret symbols constitute the main elements in the design *c*, Plate 32. Four checkerboard units separated by parallel lines were the elements used in making up the decoration for *e*, Plate 32. All four of these decorations are typical of the black-on-white wares in the eastern portion of the Little Colorado region.

Other forms of band designs composed of solid figures are shown in Plate 33, *b*, *c*, and *d*. Another example of checkerboard figures is illustrated by *b*. In the case of this design there are eight large



FIGURE 24.—Decoration on black-on-white mug

units interspaced with seven smaller ones. Through failure properly to space the figures sufficient room was not left for the eighth small unit and as a consequence only a single line extending from the top to the bottom of the band separates the two large units at that point. The large checker patterns vary in their make-up. Five of them have 4 rows of alternating black and white spaces, while the other 3 have but 3. The small units also differ; 3 of them have but a single column, while 4 are composed of 2. The bottom of the bowl was decorated by three lines of solid triangles which intersect at approximately the center. This portion of the pattern is so faded that it is not possible to see distinctly all of its elements. Still further checkerboard patterns of the band form are shown in Figure 25. Both of these are typical of one style of treatment of that motif. It was not confined to this immediate vicinity but was wide-



BLACK-ON-WHITE BOWL INTERIORS



DESIGNS IN BLACK-ON-WHITE BOWLS



LADLE BOWLS, BLACK-ON-WHITE WARES

spread in the region between the Puerco of the West and the Little Colorado and occurs, to some extent, along the Arizona-New Mexico line north of the Puerco. A large group of vessels from the Chaco Canyon were similarly ornamented. In the latter case it was also employed on vessels other than bowls, such as tall-necked pitchers and cylindrical vases.

The involved fret design on *c*, Plate 33, is the only one of its kind in this collection. It is very suggestive of certain Little Colorado decorations but apparently is an off pattern and too individualistic for close correlation with any one culture or any particular site. The simple decoration on *d*, Plate 33, is composed of two rows of opposing terraced figures. There is nothing unusual or characteristic, from the standpoint of district or culture, in this decoration. The design on the bowl *a*, Plate 33, is one which is commonly found

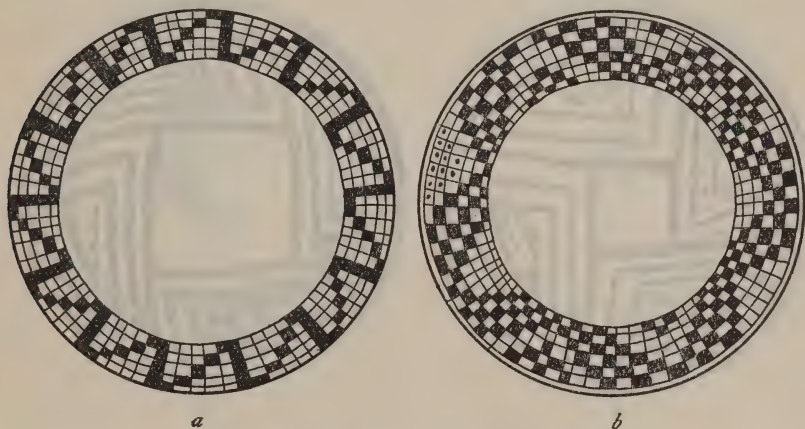


FIGURE 25.—Checker patterns from black-on-white bowls

in considerable variation throughout the eastern reaches of the Little Colorado area. The series of triangular figures separated by groups of parallel lines form a pattern which is simple yet pleasing.

A unique example of a combination solid and hachure decoration is that on the walls of the bowl pictured in Plate 33, *f*. In this case a zigzag hachured figure was painted around the interior just below the rim, and a series of solid fret symbols were extended from its lower angles. These figures were balanced by small frets pendent from the rim above the hachured element.

Solid and hachured figures in contrasting patterns of the modified curvilinear and rectilinear swastika motif are illustrated by the bowls, Plates 32, *f*, and 33, *e*. Both of these examples are typical of designs found in the hachured wares group in the Chaco Canyon. The second design is also suggestive of an Upper Gila decoration of this form. As will be observed from the photograph, both Chaco

Canyon and Upper Gila styles of hachure are present. The vessel itself, however, is more like those from the northern than the southern district. Quadrated symbols of the elaborated swastika type are also found in purely solid patterns. In the case of these designs the arms of the swastika are extended to form a fret figure. Figure 26 illustrates two decorations of this type. The first one, *a*, is not well done, and, like some of the other specimens, suggests the hand of a beginner. The second, *b*, exhibits the practiced hand of an experienced ceramist. It is characteristic of the pattern type for both black-on-white and black-on-red vessels. The decoration is one which has a wide distribution. It occurs on vessels from the Chaco Canyon, northeastern San Juan area, and the Little Colorado region.

Another solid design composed of fret figures which is typical in the Chaco region and occurs in large numbers throughout the eastern



FIGURE 26.—Black-on-white bowl designs

portion of the Pueblo area is illustrated by the specimen *d*, Plate 32. The four fret figures are so placed that they form a quartered pattern. Two of the symbols start at opposite sides of the bowl, while the other two begin at the edge of the rim above their main portions. The two whose stem parts extend entirely across the field of decoration can not be said to be balanced. The stems intersect near the center of the field for decoration and produce the design's quartered effect.

An additional figure or symbol was frequently placed in the bottom of bowls. In most instances there was no apparent attempt to correlate these with the design around the walls of the vessel. The latter are predominantly geometric in character while separate figures are generally life forms or symbols of portions of human or animal bodies. In some cases a single hand, a pair of hands, one or more bird tracks, or bear paws are present. Other specimens have

complete figures, as, for example, the two in the drawings *a* and *b*, Figure 27. The first of these depicts the humpbacked flute player, which is one of the characters so frequently found in groups of pictographs throughout the northern and eastern parts of the Pueblo region. The second represents some quadruped whose exact nature can not be determined. The geometric parts of the decoration on these two bowls are typical. That in *a* has the characteristic fret figure separated by series of parallel lines. It is very suggestive of the kind of decoration found on *a*, Plate 33. The plan and execution of both are quite similar, the main difference between the two being that the solid elements in one are frets and in the other triangles. The geometric portion of *b* is a contrasting solid and hachure decoration of the Upper Gila type. This vessel is from the black-on-red group but its design might just as well be on a black-on-white bowl



FIGURE 27.—Figures in bottoms of bowls

as far as its general characteristics are concerned. Use of figures in this way occurs on vessels from the Upper Gila, the Chaco in a more limited degree, and to a certain extent the Little Colorado.

Ladle bowls in the black-on-white wares were treated in much the same fashion as the regular bowls. In the majority of cases the decoration applied to the interior walls is of the band variety. Patterns are composed of solid and solid-and-hachure elements. The decoration of *a*, Plate 34, is composed of triangular elements placed on lines which zigzag their way around the walls. The opposing feature of the triangles was not well done and as a consequence there is an irregularity to the design which adds to its effectiveness. Whether this was intentional or accidental is not known. In the bottom of this bowl there is a turkey-track symbol. The band around the walls of *b*, Plate 34, is quite similar to many bowl decorations found in this region. The series of solid figures grouped into four panels of

three each, separated by parallel lines connecting the upper and lower borders of the band, is not unlike the pattern around the neck of the pitcher illustrated in Figure 23, *a*. The pattern in the bottom of this ladle bowl represents the only geometric design so placed in the vessels in this collection. The dots on the rim of the bowl suggest a northern treatment such as is to be observed on Proto-Mesa Verde, Mesa Verde, Aztec, and certain Chaco Canyon wares.

Combination solid and hachured decorations are illustrated by *c* and *d*, Plate 34. That on *c* is interesting because the pattern as a whole suggests a 6-pointed star, or 6-petaled flower as the case might be. The painting was not particularly well done and as a consequence the decoration loses much of its effectiveness. The hachure figures are done in the Chaco style. The second of these ladle bowls, *d*, Plate 34, bears a typical Upper Gila solid-and-hachure decoration. The similarity between this pattern and those on some of the regular bowls is striking. Although this is a black-on-white specimen the design would not be amiss on a red dipper.

The last two specimens on Plate 34, *e* and *f*, are additional examples of the use of solid figures and parallel lines in bowl designs. The basic solid symbols in *e* are the same type as those in *b*, Plate 34. In the former a series of dots separates the main elements and gives the pattern a different aspect. This design has only three solid units separated by parallel lines, whereas the other decoration has four. Two of the three units in *e* contain three figures while the third has four. The three sets of parallel lines are similar in that each consists of five. There are four units in the bowl *f*; dotted triangles forming the same kind of solid figures as those observed in *e* were placed horizontally instead of vertically in the panels. There are 2 of these figures in each unit and the 4 units or panels are separated by 4 groups of parallel lines. Use of dots in the make-up of a design occurred in the earliest ceramic stage in the Southwest and continued into later phases. The present examples illustrate the Pueblo III form.

The handles on ladles, all of which are missing from the bowls in Plate 34, were generally decorated with comparatively simple designs. A pair of undulating lines extending along the top of the cylinder (pl. 29, *c*), a number of parallel lines, two, three, or even more (pl. 30, *c*), a series of cross lines, oblique lines, dots, or on occasion a centipede constitute the usual forms of such decoration. On one or two examples the bottom as well as the top was ornamented with the same kinds of designs.

Decorations on the red-on-black bowls consist of bands and all-over designs. Numerically the band form predominates. As in the case of the black-on-white vessels, the chief elements employed in the

painting were solid and hachured figures. On some only the solid were used, others have only hachure, while the remainder have both. Examples of decorations composed wholly of solid elements are *c* and *d*, Plate 35, and *a*, Plate 36. All three of these patterns are band forms. Both *c* and *d*, Plate 35, have four units with solid figures, each unit separated from the next one by a series of parallel lines. In *c*, 2 of the groups of parallel lines contain 6, while the other 2 contain 7. Those of similar number are at opposite sides of the bowl, so that the decoration is well balanced. The four solid units are similar if not absolutely identical. This can not be said of the panels in *d*, Plate 35. Three are similar but the fourth is quite different. The three more or less alike contain two figures each. These symbols are an elaborate variation of the fret motif and are of interest because they are made up of triangular elements. The

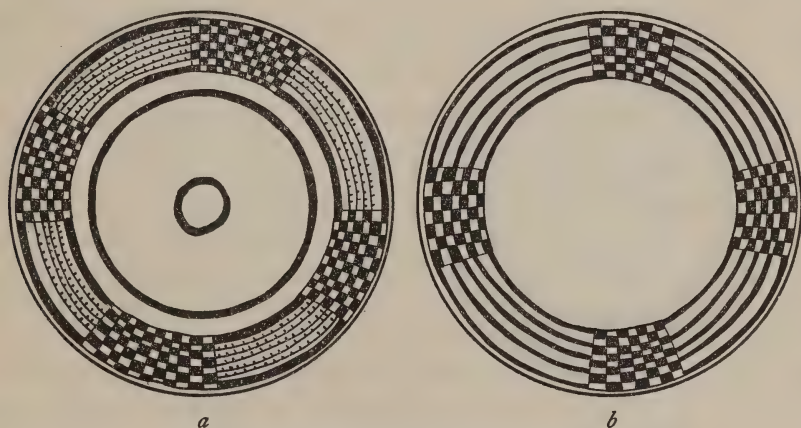


FIGURE 28.—Checker patterns on black-on-red bowls

fourth unit has variations of the same symbol, but in this case they were placed in a horizontal rather than a vertical position and, in addition, interlock. Three of the parallel line groups have eight elements, while the fourth has but seven.

The decoration *a*, Plate 36, has a band of simple checkerboard around the wall just below the rim. The thing which gives the design a unique character is the group of five figures pendent from the lower border of the band. What these were intended to represent is debatable; they may be symbols representing sandals, the tip end of a sash, or the fringe of a kilt. This is the only vessel in the entire collection bearing such figures and no fragments in the mass of potsherds from the site gave any indication of a similar symbol. Two additional examples of the black-on-red checkerboard pattern are illustrated in Figure 28. The more elaborate of the two, *a*, has four units of the checker motif placed at opposite sides of the bowl. Inter-

spaced between these are four units composed of parallel dotted lines. In two of the latter the dots are along the top edges and in the other two they are along the bottom. The heavy concentric circles in the bottom of the bowl add to the embellishment of the vessel and complete the decoration. The simpler design, *b*, has the same plan as that of *a*, but it was not carried to such an elaborate conclusion. There are four units of checker pattern placed at opposite sides of the bowl. These are connected, or separated according to the way one looks at the decoration, by four panels consisting of five heavy parallel lines running horizontally along the walls of the bowl from checker unit to checker unit. The decorations on both of these bowls, as well as the vessels themselves, are typically Little Colorado in character, especially of the district from St. Johns to Showlow and Holbrook.

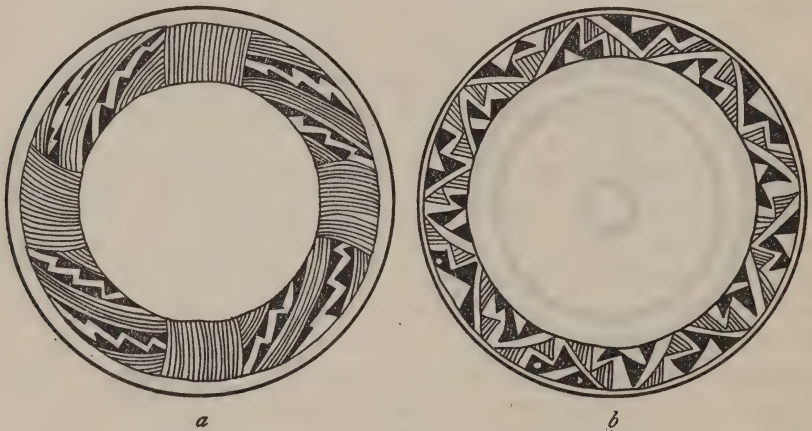


FIGURE 29.—Decorations from black-on-red bowls

Hachured figures were not as extensively used by themselves as were the solid elements. They were favored to a certain extent, however. A typical example is *f*, Plate 36. In this design, as in most of the others in this style, the hachured figures are of the rectilinear fret form placed in a band around the walls of the vessel. This style hatching is that of the Chaco. There are three figures in the decoration. Two are of the double fret while the third is a single symbol of that type. Had the two double figures been painted on a smaller scale the potter would have had room for a third complete fret of the same kind, but failure to give sufficient consideration to the amount of space available necessitated the use of the single form.

Band patterns in which contrasting elements were used are illustrated in Figure 29. The design *a* is composed of eight units, four of which are made up of a series of parallel lines. The solid por-

tions of the other units are made up of opposed rows of triangles, so placed that the space between forms a negative zigzag or lightning symbol. This pattern as a whole is quite reminiscent of those found on the interior of bowls in earlier phases of ceramic development. The second pattern, *b*, Figure 29, is a typical design of the contrasting solid and hachure of the Upper Gila variety. Patterns of this form are also found quite extensively in the Little Colorado region. They are found not only on black-on-red vessels but are equally apparent on the black-on-white.

Combination solid and hachured designs are numerous in the collection. The bowls *a*, *b*, *f*, Plate 35, and *c*, *d*, *e*, Plate 36, are typical examples. Plate 35, *a*, is a simple yet unusual form of decoration in this collection. The placing of solid figures within open spaces in the hachured figure is not common and in contrast to the usual method of balancing one by the other. In some of the sections farther west in the Little Colorado region this style was more prevalent but still not common. The second bowl, *b*, Plate 35, has a typical band of interlocking fret figures of the balanced form. The hachured portions are of the characteristic Upper Gila style which is equally prevalent on the black-on-white vessels. The band of hachure with solid star figures (pl. 35, *f*) incorporated in it illustrates a fairly popular style of decoration, if the vessels and potsherds bearing variations of it are any criterion. The use of star figures was rather common in the upper Little Colorado region, and variations of the kind of patterns illustrated by this bowl are found in widely distributed sites. The decoration on *c*, Plate 36, is one of the more characteristic red-ware patterns. The running solid line balancing and offsetting the running hachured figure is frequently observed on vessels belonging to this group. The solid portion of this design is of particular interest because of an apparent change of mind on the part of the painter. The potter apparently intended to employ a series of elongated solid triangular elements or pennant-like symbols in contrast to the hachured form, but after painting one figure continued around the vessel with a simple broad heavy line.

The next bowl, *d*, Plate 36, is also a good example of balanced solid and hachured figures. Vessels bearing decorations of this type have a wide distribution throughout the region between the Puerco and the Little Colorado and are found to some extent in the Chaco district. In contrast to the other containers in this group the design was applied to the surface previous to the polishing process and as a result the decoration seems to fade into the slip, a feature more commonly observed on certain kinds of polychrome vessels, particularly the bowls of the group with black-on-red interiors and a design painted on the exterior in white.

The combination hachure and solid decoration on the bowl *e*, Plate 36, is unique in the collection. The contrasting curvilinear figures are well balanced, starting as they do from opposite sides of the vessel and terminating in spirals on different sides. Although the design covers but a small portion of the bowl interior it nevertheless makes a striking decoration. Its very simplicity adds to its effectiveness.

All-over designs in the black-on-red group are of the combination solid and hachure variety and are characterized for the most part by curvilinear figures. Two characteristic forms are illustrated in Figure 30. The first one, *a*, is typical of vessels found in sites along the Puerco in the extreme eastern Little Colorado region and extending westward into the major Little Colorado nucleus in the district between Holbrook and St. Johns. This type of decoration, with its contrasting forms of the fret, also occurs on bowls of the Houck polychrome type. The second, *b*, represents a variation of

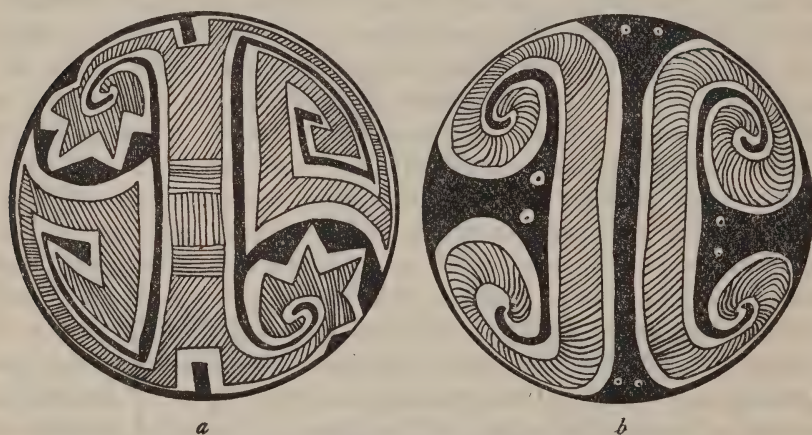
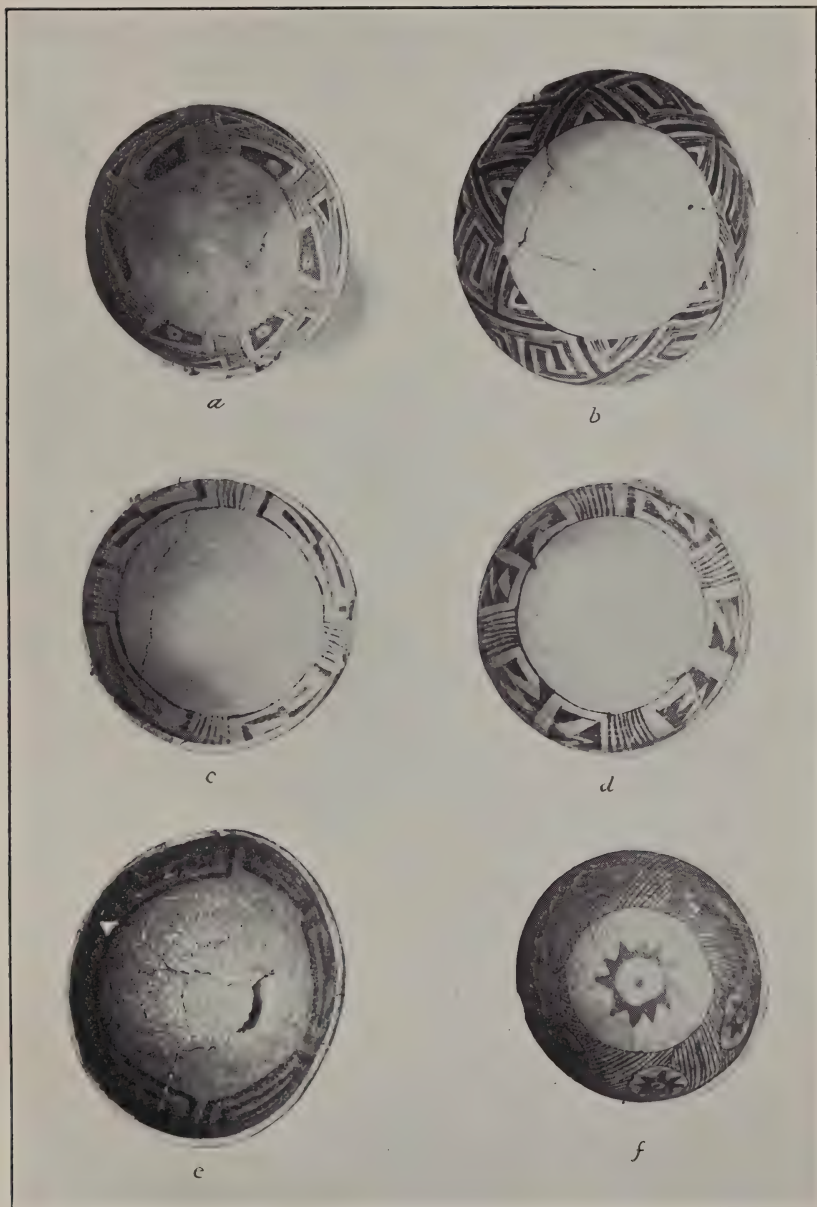


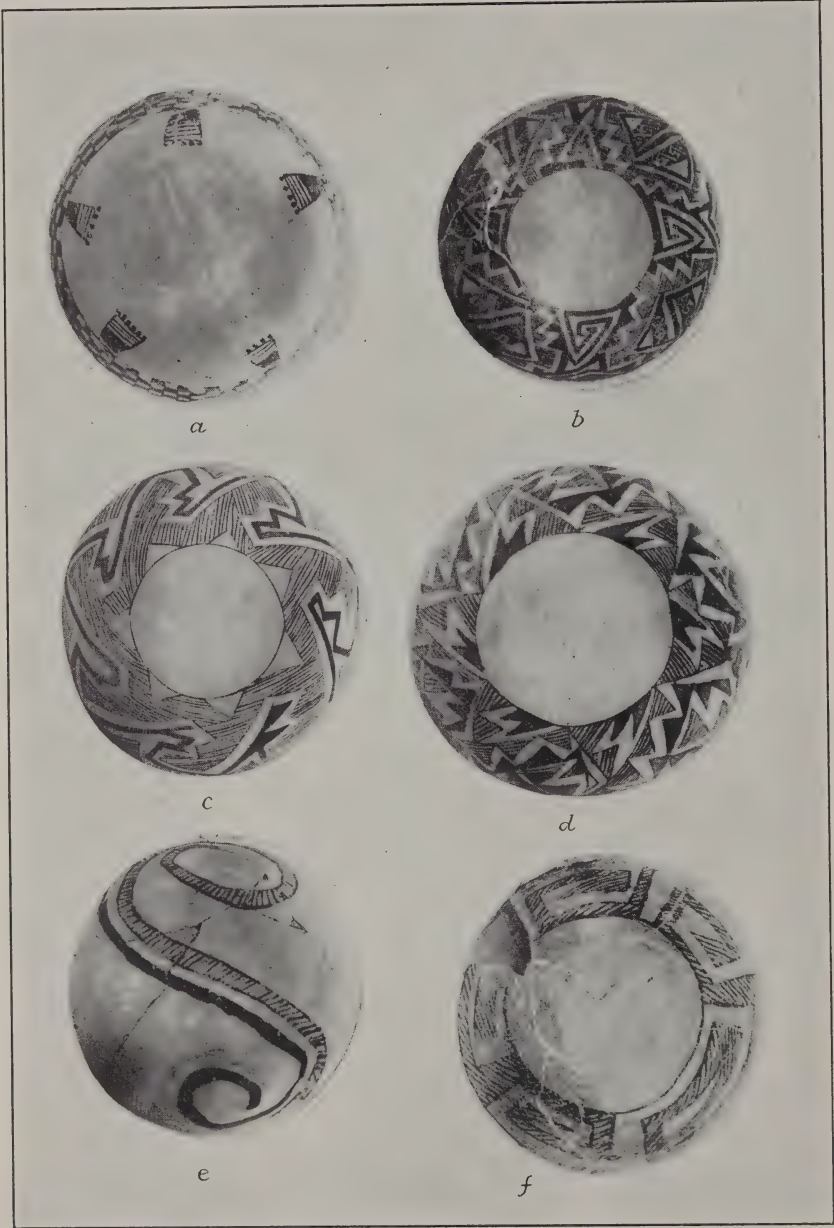
FIGURE 30.—Black-on-red all-over designs

another characteristic Little Colorado design. Whether the solid figures with eyes and whorls extending from the sides were intended to represent human heads or mythological dieties would prove an interesting subject for speculation, but nothing definite can be said about them. The hachure in both patterns is predominantly Chacoan in its form, although portions of *a* have the Upper Gila style.

The exteriors of the black-on-red vessels frequently have a single geometrical figure placed on the wall a short distance below the rim. These figures consist of simple spirals, plain triangular figures, a series of concentric circles, hourglass symbols, rectangles, scrolls, and frets. (Fig. 31.) These marks are too small and insignificant to be considered in the nature of decorations and must have been for some other purpose. It is possible that they were marks of ownership, a means of identification, which stamped the vessels as being the property of a certain individual or family.



BLACK-ON-RED BOWL DECORATIONS



DESIGNS ON COLORED WARE BOWLS



a



b

INTERIORS OF POLYCHROME BOWLS



a



b

BLACK-ON-RED INTERIORS OF POLYCHROME BOWLS

The potter's mark as it is known in the old world, where the ceramic industry was in the hands of certain families or groups of individuals and each placed its distinguishing symbol on its own product, was not present in the Southwest. For that reason it would seem that they were signs of ownership and not the trade-marks of a certain "factory." Vessels belonging to this same ceramic group in the Chaco Canyon wares were characterized by a similar exterior treatment. Judging from specimens in museum collections, the practice was more local than general, although future investigations may show it to have been quite widespread.

The polychrome bowls with black-on-red interiors and white-on-red exteriors differ only in slight degree from the plain black-on-red vessels in so far as the interior design is concerned. The patterns are largely of the combination hachure and solid varieties, and occur either as band or all-over decorations. A typical example of the band style is illustrated by *b*, Plate 37. As will be observed from the photograph, the solid and hachured elements are both contrasting

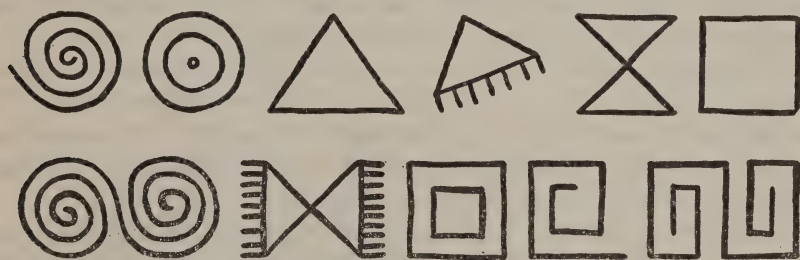


FIGURE 31.—Figures on exteriors of black-on-red bowls

and balanced. The hachure is of the typical Upper Gila form. The exterior of this bowl is ornamented with a series of dots around the wall just below the rim, and farther down has a band formed of opposing terraced fret figures. (Pl. 31, *b*.)

This decoration was painted with a thin light-colored pigment which has a semitransparent quality. The base of red shows through in portions and gives it a pinkish cast. This form of exterior embellishment is the one which, as previously stated, is the most extensively distributed of the Little Colorado types. It apparently centers in the region between St. Johns and Holbrook. An example of the all-over interior design in this group of polychrome is illustrated by *a*, Plate 38. In its general plan this decoration follows those of Figure 30. It is far more elaborate, however, and shows an intricate treatment of the contrasting solid and hachured elements. The exterior of the vessel has a band consisting of a running fret painted in white. This vessel also is quite typical of this form of Little Colorado polychrome. Fragments from vessels belonging to the group show that variations of the fret figure done in broad heavy

lines, plain bands of white in series of three or more, repeated stepped lines placed horizontally on the sides of the bowl, and repeated terraced figures with an occasional series of interlocking scrolls were the main forms of exterior decoration.

Polychrome vessels of the group with black-on-red interiors and red-on-white exteriors bear interior designs practically identical with those on the other colored wares. Solid and hachure patterns of the band style predominate, although an occasional example has a band of solid figures. The bowl *a*, Plate 37, illustrates the contrasting solid and hachure form. The close relationship existing between this and other decorations based on the same elements is clearly shown by the photographs. The main motif is again that of the interlocking fret and opposing triangles. The hachure is of the Upper Gila form. The exterior decoration consists of a band of opposing terraced figures applied in red slip paint on a white background. (Pl. 31, *a*.) The design as a whole is very suggestive of a textile pattern. The band may be considered as having two parts, an upper and a lower, separated by the negative zigzag passing through its center. Another example of the same type of polychrome exterior decoration is illustrated by *a*, Plate 27. Here again red slip paint was applied over a light-colored wash. The decoration is made up of six modified fret figures. These are connected by oblique panels composed of opposing triangles so placed that they form negative lightning symbols.

The interior decoration of this bowl is of the contrasted hachure and solid-band variety. (Pl. 36, *b*.) It is one of the best conceived and executed decorations in the entire group. The hachured elements are in the Upper Gila style and the solid symbols are mainly of the fret and triangle type. This pattern is very suggestive of the more highly developed St. Johns-Holbrook variety of the Little Colorado wares. An example of the sole use of solid figures in the interior decoration is *e*, Plate 35. This design consists of a series of six rectilinear fret figures. Five of these are similar but the sixth is different. It has a series of dots along the inside edges of the fret. The exterior has the same treatment as the preceding vessel, but its general appearance suggests that it may have been a copy rather than a true example of the type. A light-colored slip was applied to the exterior and on this background a series of six hands was painted. At one point, just midway between two of the hands, a small rectangle appears. It has no apparent connection with the rest of the design and adds little to its decorative quality. Why it should have been placed there is not known. (Pl. 27, *b*.)

Decorations on the interior of the Houck style of polychrome also are quite similar to the general group of black-on-red patterns.

Solid figures in some cases make up the entire design, in others solid figures and parallel lines in alternating units furnish the motif, but the predominant decoration is a combination solid and hachure pattern. A good example of the latter is *b*, Plate 38. This is a well-balanced design composed of interlocking figures which combine the rectilinear and curvilinear style of drawing. The hachure in this design is of the characteristic Chaco Canyon form and as a matter of fact the decoration as a whole, while it has a distinct affiliation with the Little Colorado form of solid and hachure elements, is such that it might just as well have appeared on a black-and-white vessel from Pueblo Bonito. The exterior of this bowl has a decoration in red slip paint applied to the orange-colored surface of the paste. The design consists of a series of rectilinear meanders which form a band bordered above and below by broad, heavy lines. (Pl. 31, *c*.) Other exterior decorations have interlocking frets, spirals, triangular, and concentric rectangular figures as the main elements.

Ladle bowls in the colored ware group bear designs similar to those found on the interior of bowls. No complete specimens of the black-on-red were found. Fragments from a number were in the potsherds from the refuse deposits in the rooms of the houses and the dump mounds. They all bear portions of decorations showing that the patterns were of the forms discussed in connection with the black-on-red bowls. No ladle fragments from the Little Colorado polychrome wares, either those with the white-on-red or red-on-white exteriors, were found. The Houck style of polychrome is well represented in the collection, although there are no complete ladles of the type. Portions of bowls, from one-half to three-quarters, are fairly numerous. For some reason or other handles are scarce, and in no case is one attached to a portion of a bowl. The interior decorations on the Houck ladle bowls are in keeping with the general style of patterns already discussed. Solid figures, combination solid elements, and contrasting solid and hachured symbols are employed in various ways to form band patterns.

Two examples are shown in Figure 32. The first, *a*, has two rows of opposing terraced figures. This decoration is a close counterpart for the one on the black-on-white bowl illustrated in Plate 33, *d*. One interesting feature in connection with this design is that along one side sufficient space was not left to accommodate the lower row of terraced figures in the upper band. As a result the upper part of the band for about half the circumference of the bowl has an incomplete pattern. On the exterior the decoration is in red slip paint on the orange background of the paste. The elements are interlocking spirals with serrated edges. (Fig. 32, *c*.)

The second interior decoration (fig. 32, *b*) probably consisted of eight units. Because a portion is missing it is not possible to be

absolutely certain that the design was of the balanced variety, but it seems likely that such was the case. Three of the units, and probably the missing fourth, were formed from a series of parallel lines extending from the upper to the lower border of the band. The other 4 units, 3 of which and a portion of the fourth are actually present, have 2 oblique panels of solid figures separated and framed by parallel lines. As will be seen from the drawing, the panels are not identical. In the two units on the lower half of the decoration the inner panels are practically the same and the outer are comparatively similar. The unit at the upper left-hand portion of the



FIGURE 32.—Designs from Houck polychrome ladles

pattern has two quite comparable handles, both of which are not greatly different from the inner solid symbols of the lower units, the chief variations being that in one instance the tips of the upper triangles touch while in the other they do not. The portion of the fourth unit of solid figures shows simple opposing triangular elements instead of the more elaborate kind. The exterior decoration on this object is more complicated than that of the preceding example. The design is in red slip paint which contrasts sharply with the orange base color of the vessel. The decoration is made up of solid elements drawn in a combination rectilinear and curvilinear style. (Fig. 32, *d*.) The lower portion of the exterior pat-

tern suggests that on the exterior of the polychrome bowl, *a*, Plate 31. The latter is not of the Houck variety, however.

Ladle handles on the black-on-red and Houck polychrome groups were all of the tubular form and bore decorations similar to those on the black-on-white. Parallel lines running the long way of the handle, a series of oblique lines, or lines running at right angles to the long axis, an occasional fret figure, spiral, a panel of opposing solid elements, and sporadic hachure symbols were the chief elements employed in the designs.

ADDITIONAL POTTERY OBJECTS

The objects of fired clay obtained from the excavation are not wholly restricted to the group considered as containers. There are a number of specimens which, although closely related to the pottery vessels because they are made from container fragments, had other uses than that of holding food or liquid. They consist of the scrapers used in smoothing down clay vessels during the process of their manufacture; round flat discs, with and without perforations; tubular rings of varying length made from broken ladle handles and from jar necks. The purpose of the circular discs has long been questioned. Those with perforations have been considered parts of implements used in weaving. Some believe that they functioned as buttons at the end of spindle shafts to prevent the thread from slipping off. Others insist that they were true spindle whorls and acted in the capacity of small fly wheels to assist in the whirling of the spindle. There is a possibility, also, that they may have been for use in fastening articles of clothing. A few examples have been found in which a piece of thong was passed through the hole and held in place by knots. When prepared in this manner they could have been fastened to a blanket and have held it together in the form of a rude cloak. Attached to a kilt, or woman's garment, they would have made very serviceable buttons. Those without the hole through the center may represent unfinished whorls or buttons, although it is possible that they may have been a form of counter used in games. What the small cylinders made from ladle handles could have been used for is not known.

One group of fired clay objects usually found in ruins was entirely missing at this site. No examples, not even a fragment, of the tubular or cloud-blower pipes, nor any of the elbow forms, were found. In many parts of the Pueblo area the tubular pipe, very similar in shape and size to a modern cigar holder, was employed in fairly large numbers. It has been called by the name cloud-blower because some of the modern people make use of the same type of object in certain ceremonies. During the course of some rites puffs

of smoke are blown toward the cardinal points from such pipes, the smoke being considered symbolic of rain clouds and endowed with the ability to attract them and their life-giving water to the vicinity. Why they should have been absent here is not known. It is significant, however, that a similar condition was found at another ruin in this same general region. At the Long H Ranch, 42 miles southwest from Zuñi, a small pueblo was excavated, and while most of the usual kinds of artifacts were found no pipes were obtained. This was particularly emphasized by the fact that near-by pit houses of an older stage of development yielded quite a number.⁵³ The absence of the ceremonial pipe from two sites in this district may be a factor of considerable significance, and again it may only be coincidence. Ruins at no great distance west from the Long H pueblo and others not far removed from the Nutria Canyon village have had them. The places where they were found, however, represent somewhat later stages and it is possible that during the preceding phase there may have been a decline in the use of such pipes. Further evidence is needed, however, before any definite conclusion can be drawn.

BASKETRY

This phase of the material culture of the inhabitants of the Village of the Great Kivas is represented in the collection of specimens by only a few charred fragments. In view of this fact it is not possible to give a detailed discussion of the variety of baskets which the people made. Two different forms of technique are apparent in the fragments. One is a coiled method comparable to the common, widespread southwestern form, the other a diagonal checker weave. The fragments from the coiled baskets show that they were of the usual type in which two rods and a bundle were used. The rods were placed side by side and the bundle surmounted them. The bundle in this case consisted of long strips of fibrous material, apparently shreds of yucca leaf, whose purpose it was to provide the medium through which the stitches holding the coils together could be passed. The rods employed were small and the stitching fine. When the baskets were new they must have been comparable to the finest that have come out of the Southwest.

The second form of basketry, that of diagonal checker weave or twilled work, is illustrated in the collection by two fragments, both from the rim portions of the containers. (Fig. 33.) The upper edge had no reinforcing rod and the rim was formed from the wall material itself. The latter was bent over and carried on down the side to form a double wall. The material used appears to be yucca,

⁵³ Roberts, F. H. H., jr., 1931, p. 159.

but because of the charred nature of the specimens it is not possible to tell just which form of that plant was employed.

BONES AND BONEWORK

The bones and bone implements found during the investigations at this site are of interest because they not only show the various types of tools which the people fashioned from that material, but also furnish a record of the kinds of animals which were present at the time when the site was occupied. The animals represented are the mule deer, antelope, jack rabbit, lynx, wolf, fox, and dog. The only bird bones in the collection are from the turkey. The bonework comprises a fairly large variety of awls, scrapers, punches, beads, turkey calls, and ornaments. The implements may be separated into several groups from the standpoint of the kinds of material used. That is, some were fashioned from bones intentionally cut for the purpose, others were made from fortuitous splinters, and others exhibit but slight modification of the original bone.

Typical examples of awls made from chance splinters are illustrated in Plate 39. Prac-

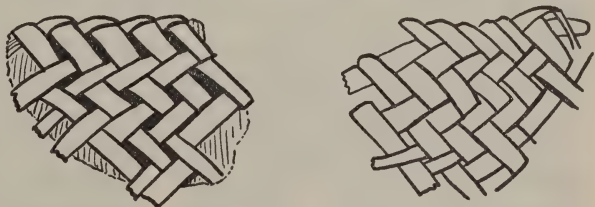


FIGURE 33.—Basket fragments

tically all of these specimens are fragments from long bones of the deer. One or two in the collection, however, were made from ribs or some other bone. Most of the specimens show a partial polish at their points. This was not intentionally done but was produced through use. The sharpened splinter group rarely has examples with a careful polish over the entire surface. There is a group, however, of specially cut implements which were made from discarded portions of bones which does show a careful shaping and polishing over most of the surface. Examples of awls belonging in this class are illustrated in Plate 40. In many instances the work of preparing the implement was so carefully and thoroughly done that it is impossible to tell from what animal the material came. A few of the examples can be identified as deer bone, the long bones and ribs occurring in greatest numbers. In specimens of this type the ends opposite the points were generally cut and smoothed, a feature rarely found in the case of awls made from fortuitous splinters. The illustration, Plate 40, clearly shows the nature of this refining touch. Such implements would be doubly useful inasmuch as the sharpened end could be used for perforating purposes while the blunt

one would serve as a spatulate tool for smoothing or rubbing where a point would be unsatisfactory.

Specially cut awls formed by splitting a long bone lengthwise and sharpening one end, but otherwise making slight modification of the original form, are illustrated by the group of specimens in Plate 41, *a* to *e*. These were all fashioned from a long bone of the deer and beyond the splitting and sharpening processes were not worked. The other three specimens shown in this same plate, *f*, *g*, and *h*, are of the same bone but exhibit more modification in that the sides are polished. The question of length is largely relative, the shorter specimens probably representing implements which have seen considerable use and as a consequence were materially shortened through repeated sharpening of the points. The cannon bone of the deer was a favorite source of material for making awls with but slight effort on the part of the bone worker. All that was needed to make a serviceable implement was to split it lengthwise, leaving the condyle at one end to form a handle and sharpening the other for the point. Plate 42 shows several examples of this kind of awl. The extremely long forms are more frequently found in Pueblo III ruins than in the preceding stages. The awl found in greatest numbers in the early phases of southwestern development is the short stubby form illustrated by *c* and *d*, Plate 42. Its prevalence suggests that it was intentionally stubby, not the result of many sharpenings of a long implement. It is present in the following horizons but is not as characteristic as the longer ones.

The deer was not the only animal, or perhaps one should say the only creature, which supplied bones that made satisfactory tools with but slight modification of the original form. The turkey contributed its share, and a large number of awls were made from the "drumstick" by simply putting a point at one end of the shaft. Specimens of this type of awls are illustrated in Plate 43, *a* to *f*. The femur bone of the wildcat was also quite serviceable, and *g*, Plate 43, shows an implement fashioned from it. There are several such tools in the collection. The legs of the jack rabbit supplied good material, and many examples were found shaped from the tibia of that animal. (Pl. 43, *i*.)

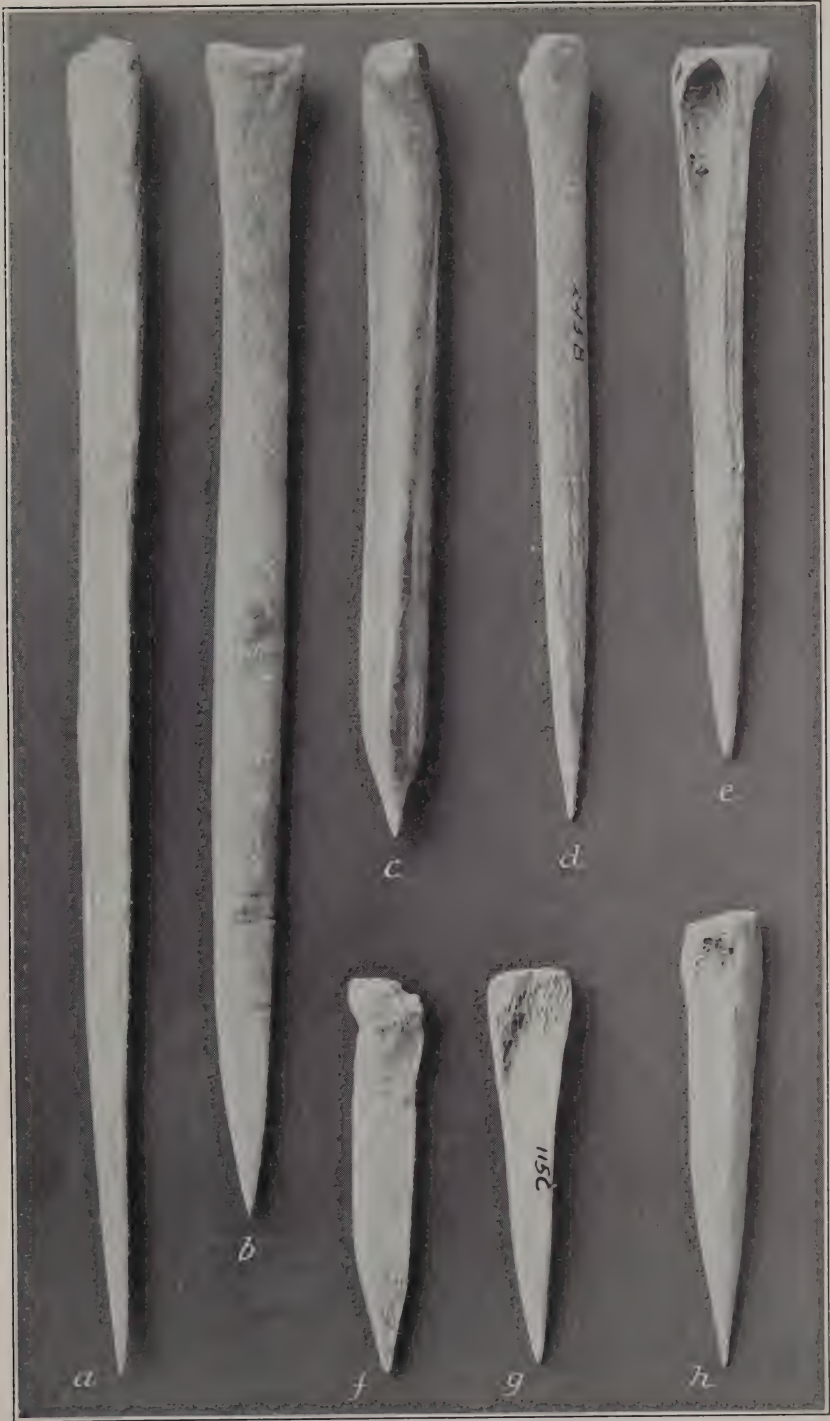
The ulna of the mule deer was extensively employed in the manufacture of awls and daggers. It is practically impossible at this late date to say which the objects were intended to be, implements for perforating materials in the peaceful pursuits of industry or weapons. They would have functioned efficiently in either capacity. The bones were particularly well adapted for making tools with a minimum of effort. The condyles, with their projecting olecranon processes, furnished good handles without any modification, while the long, tapering shafts required only the preparation of points to



AWLS MADE FROM BONE SPLINTERS



POLISHED SPLINTER AWLS



AWLS MADE FROM BONES SPLIT LENGTHWISE



SPLIT BONE AWLS



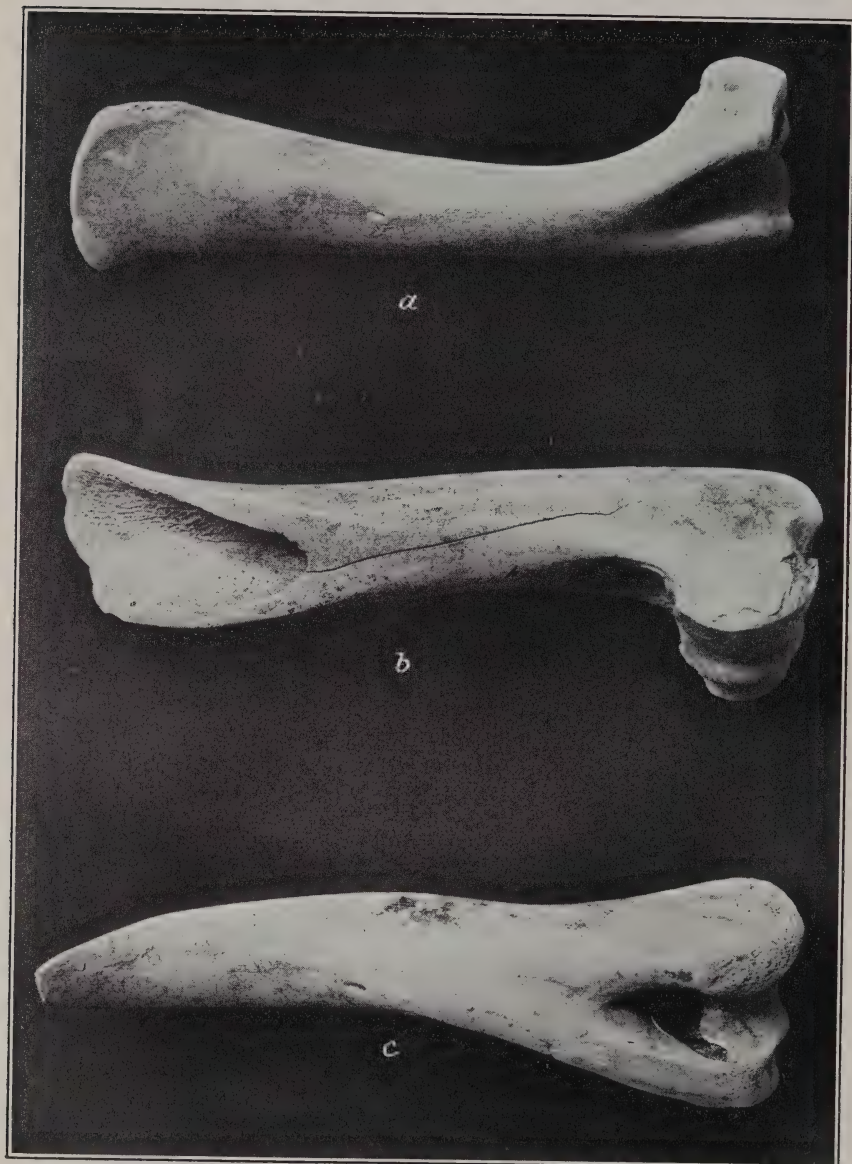
AWLS MADE WITH SLIGHT MODIFICATION OF ORIGINAL BONE



ULNAE AWLS. SHARPENED POINTS ONLY ALTERATION OF BONE



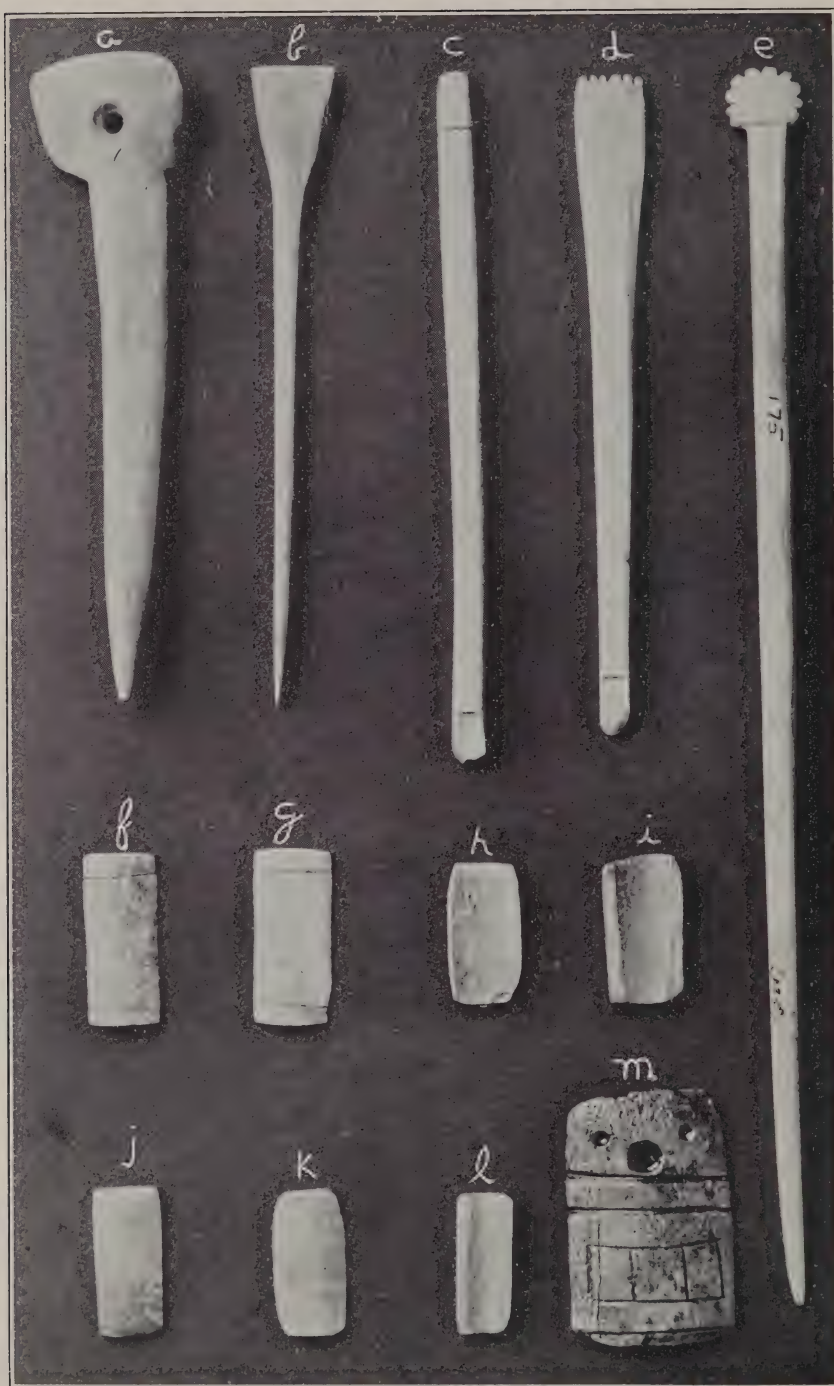
IMPLEMENTS MADE FROM RABBIT BONES



FLESHERS OR SCRAPERS



SMALL SCRAPERS, PUNCH, AND BONE TUBES



AWLS, TABLETS, AND PENDANT OF BONE

make the instruments. A number of examples of this kind of tool are illustrated in Plate 44. The type is quite widespread in the Southwest. Hodge found numerous examples at Hawikuh,⁵⁴ Pepper pictures them from Pueblo Bonito,⁵⁵ and they have been found in numerous other sites throughout those districts.⁵⁶

Another group of awls made with little change in the form of the original material are those fashioned from the leg bones of the jack rabbit. The front leg of the animal supplied a larger percentage of the raw material than any other portion of the body, judging from the actual number of such specimens in the collection. Plate 45 shows a group of these implements.

Included in the collection are a number of large scrapers or fleshing tools made from deer bones, the humerus, which are characteristic of a type which was developed in the Pueblo III period. (Pl. 46.) This form of implement is one which is best known from the elaborate examples found by Pepper in the Chaco Canyon. The people at Pueblo Bonito frequently embellished the shafts and heads of these tools with a mosaic of turquoise or turquoise and jet.⁵⁷ Large numbers, in an undecorated state, however, were found at Aztec.⁵⁸ They were present on the Mesa Verde and have been noted at numerous sites throughout the northern part of the Pueblo area. They were not confined to that region, however. Examples were found by Fewkes in ruins in the eastern Zuñi district, and sites farther west have yielded an occasional specimen.⁵⁹ Considered from a general point of view, they are more characteristic of the northern and eastern portions of the area than of the southern and western. A short, stubby form of scraper which is also characteristic of the northern cultures was made from the phalanges of the deer. Two examples were found at this site. (Pl. 47, *a*, *b*.) In making this type of implement one end, including the condyle, was cut off and a beveled edge supplied. In shape and general treatment they are quite similar to the large ones just described. Examples are numerous in the collections from Pueblo Bonito and Aztec.⁶⁰

The short, blunt-pointed implement with a groove around its base end (pl. 47, *c*) is the only specimen of its kind in the collection. The point is not sharp enough to have been used as an awl, although it could easily have functioned as a punch. The groove possibly was provided so that the object could be fastened to the person of the owner by a thong.

⁵⁴ Hodge, F. W., 1920, Pl. xviii.

⁵⁵ Pepper, G. H., 1920, pl. 9.

⁵⁶ Morris, E. H., 1919 *a*, p. 39, fig. 23, *d*.

⁵⁷ Pepper, G. H., 1920, pls. 1, 11.

⁵⁸ Morris, E. H., 1919 *a*, p. 36, fig. 23, *e*.

⁵⁹ Fewkes, J. W., 1909 *b*, pl. 1, nos. 13 and 17; Roberts, F. H. H., jr., 1931, pl. 31.

⁶⁰ Morris, E. H., 1919 *a*, p. 37, fig. 22, *b*.

Tubes and beads of bone are distinguishable solely by their size; as a matter of fact, a division of objects of this nature into two groups is purely arbitrary. The difference is one only of length, the range being from seven-eighths of an inch (2.222 cm.) to 3 inches (7.62 cm.). The tubes were usually cut from the shaft portions of turkey bones, the ulna, radius, or femur. The longer forms were more generally used as beads in necklaces, while the shorter were employed in bracelets of the wrist-guard type. The small examples also were occasionally made into handles for awls. In other instances the larger ones may have been used as flutes, whistles, or drinking tubes. The object *i*, Plate 47, is a tube with a perforation in one side at approximately the center of the shaft. This is one of the so-called turkey calls used by hunters in attracting game. The Zuñi employed in the excavations were able without the slightest difficulty to reproduce various sounds made by the turkey by blowing into the hole. All insisted that it was for such a purpose, and since they were able to use it so efficiently there is no reason to doubt its purpose.

Objects of extensively worked bone are not as common as those of the slightly modified forms. Punches and awls were made by cutting, shaping, and polishing the original form. Plate 48, *a* and *b*, illustrate two examples. The first, *a*, is a punch with a spatulate end opposite the point. The perforation probably was for suspension. The unusually sharp pointed implement, *b*, also has a spatulate base. The bone in this awl was trimmed and polished until there is little left of the original contour, and it is not possible to identify the animal from which it came. The objects *c* and *d*, Plate 48, also exhibit a high degree of workmanship and a very fine polish. Inasmuch as both are broken, it is difficult to determine what their functions may have been. The notched end of *d* suggests that it might have been a weaving tool, but if it were intended for such a purpose it was never so employed, because there are no traces of wear or rubbing in the notches. The Zuñi workmen insisted that the object was a head scratcher. It unquestionably would be very serviceable in such a capacity, but whether that was its actual function or it had some other use is purely conjectural.

The specimen *e*, Plate 48, was carefully cut and rubbed to an unusual degree of smoothness, and the ornamental head suggests that it was for decorative rather than utilitarian purposes. It may have been a hair ornament or might well have functioned as a pin for fastening an article of clothing. The group of small tablets made from shafts of long bone, Plate 48, *f* to *l*, were neatly trimmed and rubbed to a high gloss. They probably were fastened to some sort of base which was worn as a decorative object. One hundred and

ten such pieces were found lying in a rectangular form on the floor in one of the rooms of house B. Their position was such as to suggest that they had been part of a plaque, perhaps an ornamental breast-plate, the foundation of which had disintegrated and disappeared. In most cases there is a fine groove at each end of the small pieces, and they might well have been held in place by sinew or fine thread lying in the groove. Only one example of a bone pendant was found. (Pl. 48, *m*.) A piece from the shaft of a long bone from a large mammal furnished the material from which it was made. The decoration on the pendant was cut into the bone and the incisions filled with a dark-colored substance. This treatment emphasized the lines of the design and produced a contrast between them and the natural color of the bone.

OBJECTS OF STONE

Tools, implements, weapons, and other objects made from stone are numerous in the collection of specimens from this site. The material was employed in the manufacture of metates or milling stones, mortars, mauls, ax heads, jar stoppers, arrow-shaft smoothers, small mortars and pestles for grinding paints, ceremonial objects, knife blades, spear and arrowheads, ornaments, and effigy heads. Some pebbles and stones were employed in their natural state; for example, the pottery polishers and various forms of concretions which were endowed with supernatural characteristics. Several kinds of stone were used in making the different objects. In the collection are specimens of sandstone, lava, diorite, amphibolite, chalcedony, jasper, granite, and slate. Two techniques were employed in the manufacture of objects. One was pecking and grinding, the other chipping and flaking.

The metates or milling stones were shaped by the pecking and grinding method. These objects are of two types and were made from two different materials. One form is the open-end trough or grooved variety. (Pl. 49, *a*, *b*.) The other type is flat from side to side and slightly concave from end to end. (Pl. 49, *c*, *d*.) The material in all four of these specimens is a hard sandstone. Both types of metate were also made from lava. No whole specimens of the trough form were found, but there were sufficient fragments to show that the material had been used in them. Two examples of the flat form are illustrated by *a* and *b*, Plate 50. While it might seem that the large holes and depressions in the surface would be a hindrance to the proper grinding of corn, the lava blocks were more efficient than the sandstone variety. The holes would soon become filled with ground meal and not retard the milling process. In addition, portions of the surface would not be ground into the meal to as great a degree as in the case of the softer sandstone. At the present

time many of the metates in use at Zuñi are of lava, and the women prefer that material because of its durability.

It will be recalled that in the discussion of the mealing bins in rooms 49 and 23 it was pointed out that the trough or groove type of metate was found only in the old, original part of house A, while the flat concave forms occurred throughout the subsequent additions to the structure and in house B. Attention was also called to the fact that all evidence seems to point to the use of the flat metate in mealing bins. The grooved form at this locality was not used in a bin. This same condition was observed in the pueblo on the Long H Ranch,⁶¹ and evidence elsewhere points to a similar practice. The grooved metate is essentially a northern form, while the flat variety is more characteristic of the southern and western portions of the Pueblo area. The evidence in this location was that the flat type replaced the grooved variety at approximately the same time that the community was augmented by an appreciable number of people. This would tend to show that the flat metate was probably a contribution on the part of the new arrivals, and taking into consideration various other factors in the material culture would suggest its southern origin.

The manos or hand stones used with the metates were of the flat, single-hand form. The sandstone examples have a convex upper surface as a general rule, but an occasional specimen is of the flat, tabular shape. The material from which they were made was probably too hard to warrant the additional efforts needed for rounding off the upper surface. The association between metates and manos was such that there can be no question but what sandstone was used on sandstone and lava on lava.

Only a few examples of mortars were found around the site, and there were no pestles accompanying them. The mortars are large sandstone blocks with a deep, circular depression cut in one side. (Pl. 50, *c, d*.) In some instances the outside of the block was shaped, while in others little attempt was made to alter the irregular form of the stone. The insides of the cup portions did not show signs of a marked amount of wear. These objects may have been used for grinding nuts and wild seeds or in pounding roots and herbs. Because of the numerous metates it is not likely that they were employed in grinding corn. Why there were no pestles to accompany the mortars is not known. From the relatively small percentage of whole specimens and fragments it would appear that objects of this type were not extensively made by the inhabitants of the village. The only locations in which mortars and fragments from them were found were the late portions of house A and in house B. In view

⁶¹ Roberts, F. H. H., jr., 1931, p. 154.

of this, together with the fact that grinders of this form occur more commonly in the ruins to the south and west, it seems evident that they were another contribution on the part of members of the community coming from that region.

Mauls were made from lava and sandstone by the pecking and grinding process. Two shapes are represented in the collection. The commonest form is a short, cylindrical head with flat striking surfaces and groove completely encircling the object. (Pl. 51, *b*, *c*, *d*, *f*.) The other variety is a tabular-shaped object with flat sides. (Pl. 51, *a*, *e*.) The striking surfaces on most of them are flat, as in the case of *e*, but an occasional specimen tends to a rounded or blunt pointed end as illustrated by *a*. The groove on the flat mauls is of two types; on the majority of specimens it completely encircles the stone. A few examples, however, show it only on three sides. The three-quarters form is more common to the south and west than in the north.

The ax heads are all of the grooved form, with comparatively short cutting edges. (Pl. 52.) In some instances they were made from oval-shaped boulders and in others from rather flat pieces of stone. On some of the specimens the base is quite flat, while on others it is rounded. There is a distinct correlation between the type of base and general shape of the axes. The oval forms have the rounded base and the tabular specimens the flat. The grooves on the ax heads, as in the case of the mauls, are of two forms. They either completely encircle the stone or are of the three-quarters type. The complete groove is present on a majority of the specimens. The short, stubby type of cutting edge is characteristic in the Little Colorado region, and while no typical examples of that kind of bit are present in this collection the axes indicate a tendency in that direction. Materials used in making ax heads were diorite and amphibolite.

Stoppers for use in the large jars were made from sandstone. (Pl. 53, *a*, *b*.) These stoppers were made with a neck or plug which fitted down inside the neck of the jar and a head which served both as a handle and as a means of holding the stopper in place so that it would not slip down too far into the orifice. The plug portions of these objects were either cylindrical in shape, such as that illustrated by *a*, or rounded off, as in *b*. The heads were of the mushroom or flat varieties. The mushroom type generally is associated with the cylindrical plug, as in the case of *a*, and the flat heads with the rounded stem illustrated in *b*. Stoppers of this kind are found in fairly large numbers in ruins to the south and west, but only occasionally are they present in northern sites. Fired-clay stoppers are not uncommon in the northern parts of the area, but the stone forms seem to have been a southern development. Thin, circular disks of sand-

stone were quite generally used as covers on jars, but the more specialized forms, such as shown here, were more restricted in their distribution.

Among the stone objects is a considerable group comprising what is commonly referred to as arrow-shaft polishers. The latter are irregular-shaped stones, generally sandstone, with a groove in one side. (Pl. 53, *c-f.*) Objects of this kind are commonly supposed to have been used in smoothing and shaping the shafts of arrows. Whether or not they were actually for that purpose can not definitely be stated. Similar objects have been found at various ruins throughout the region. Hodge illustrates the form he found near Hawikuh.⁶² Hough obtained examples in the section east of the Petrified Forest,⁶³ and Fewkes secured numerous specimens in the course of his work at various sites in Arizona. The form is not always as simple as those illustrated in Plate 53 but occasionally has an elaborate and careful finish. The latter are more commonly found along the Upper Gila,⁶⁴ although the simpler forms such as pictured here were also employed in that section.⁶⁵

An interesting series of stone objects is the group of paint grinders. These are small stones with circular or oval depressions in which the minerals supplying the pigments used for various decorative purposes were ground. The stones may be small, irregularly shaped fragments with a small concave cup, flat tabular stones with an oval depression, or flat rectangular slabs with two circular depressions. (Pl. 54.) Occasionally one of the paint mortars is a circular cuplike object with a groove around the center. (Pl. 55, *c.*) The pestles used in grinding pigment are cylindrical stones with flattened ends. (Pl. 55, *a, b.*) Mortars of the forms pictured in Plate 54 are common throughout the region, and examples can be found in use at the present time in the village of Zuñi. The more elaborate type with the encircling groove has not been observed at many sites. Fewkes found an almost identical specimen at Pueblo Viejo on the Upper Gila.⁶⁶ He does not report it as a mortar but simply calls it an unknown stone object. He does, however, suggest that it has the form of a paint mortar. The example in the present collection leaves no doubt in the matter, since the inside of the cup was thoroughly covered with red ochre. The occurrence of paint mortars in the Pueblo area is more pronounced in the southern portions than in the northern, and it may be a cultural feature developed in those parts. The specimen with two depressions (pl. 54, *d*) is

⁶² Hodge, F. W., 1923, fig. 2.

⁶³ Hough, W., 1903, pl. 55.

⁶⁴ Fewkes, J. W., 1904, figs. 112, 113.

⁶⁵ Hough, W., 1914, p. 18.

⁶⁶ Fewkes, J. W., 1904, fig. 115.



a

b

Grooved form



c

d

Flat type

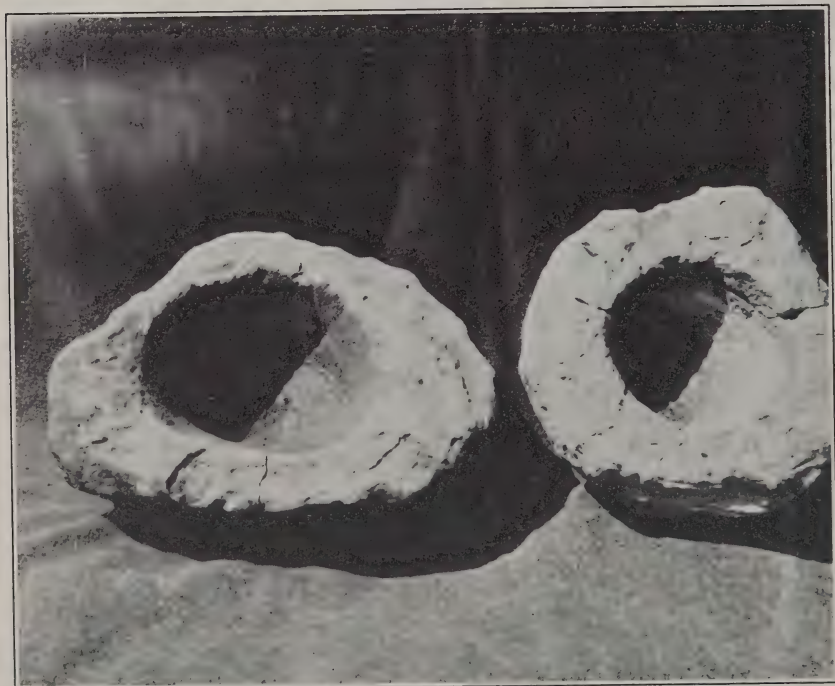
SANDSTONE METATES



a

Lava milling stones

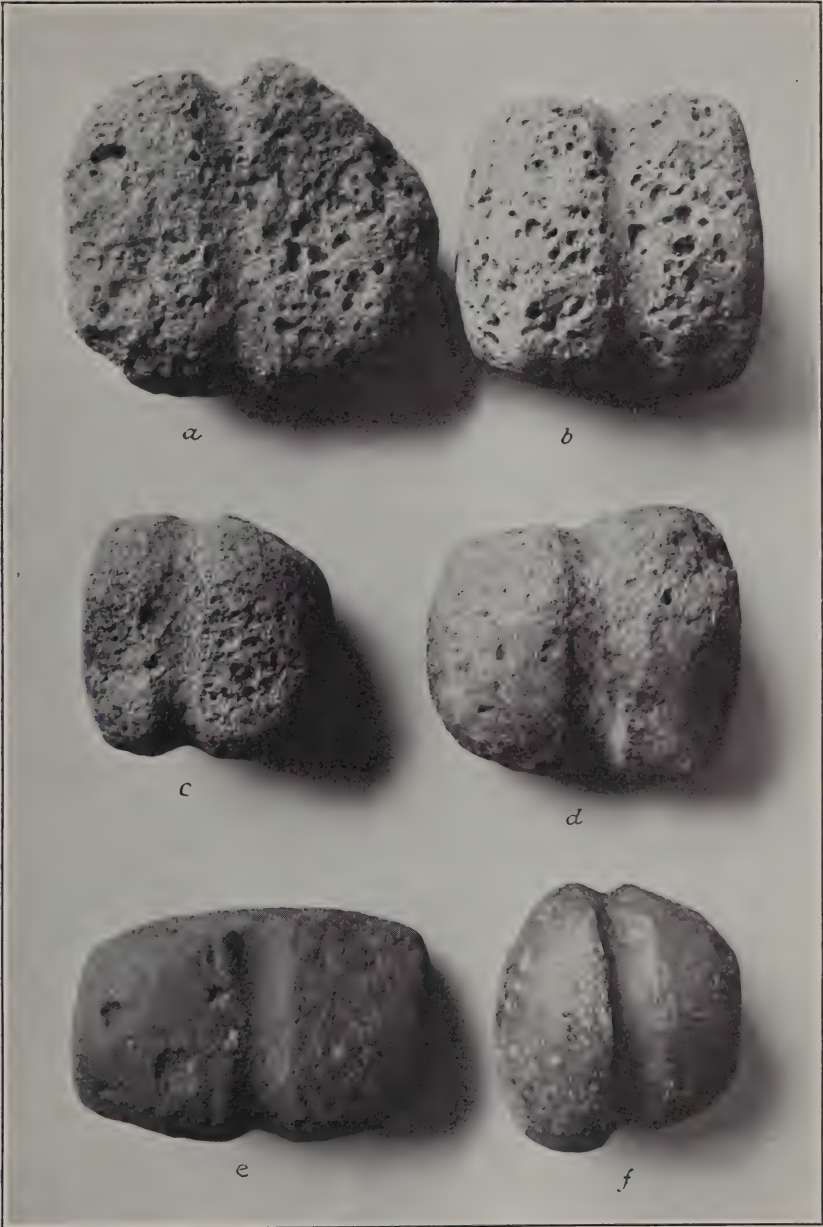
b



c

Sandstone mortars

d



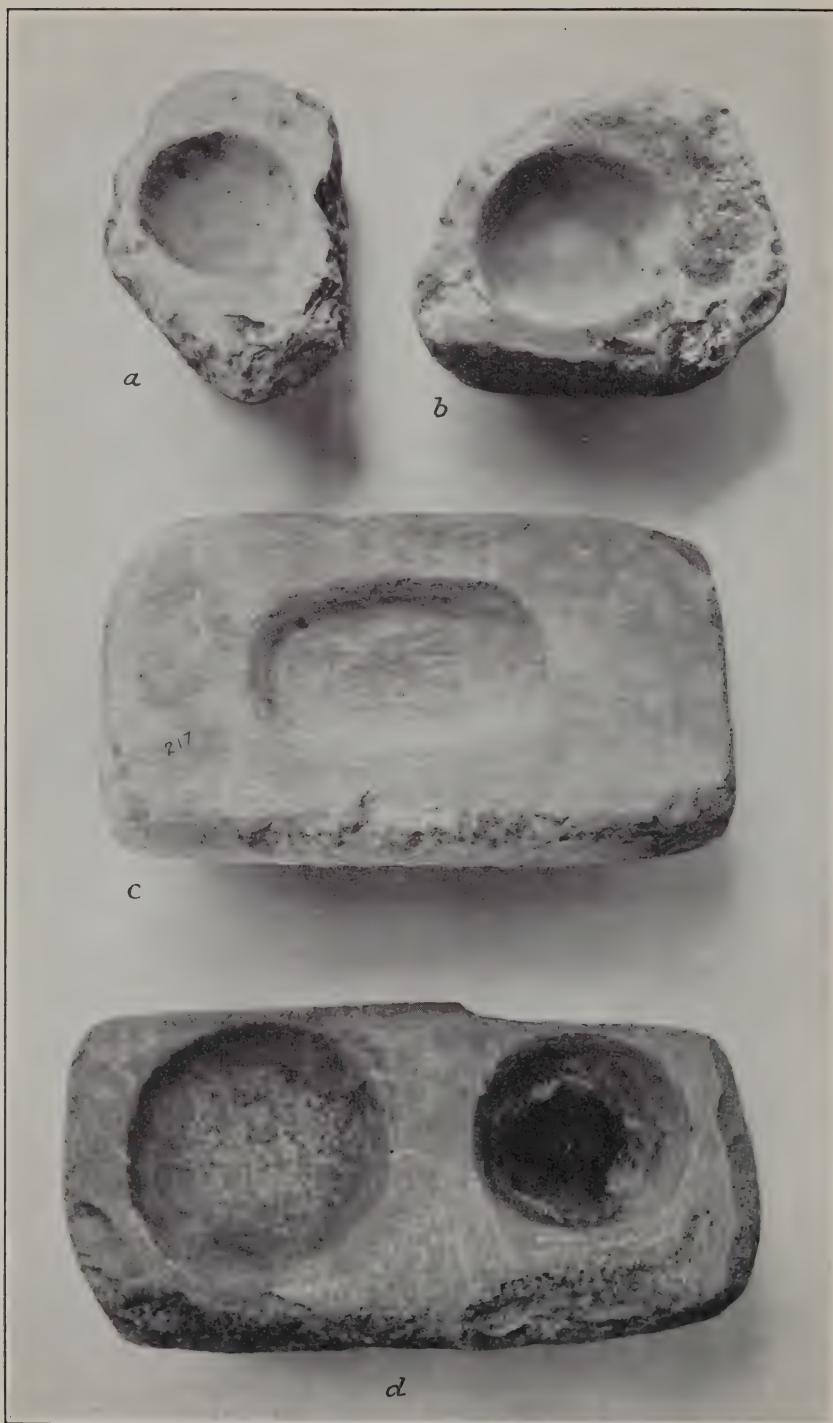
MAULS



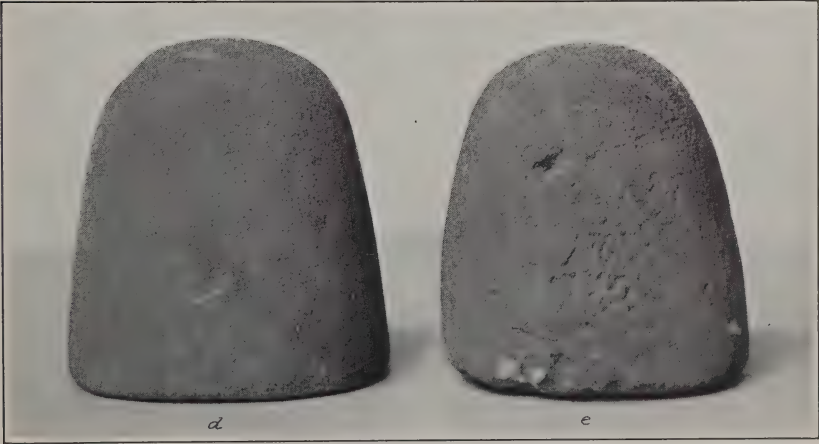
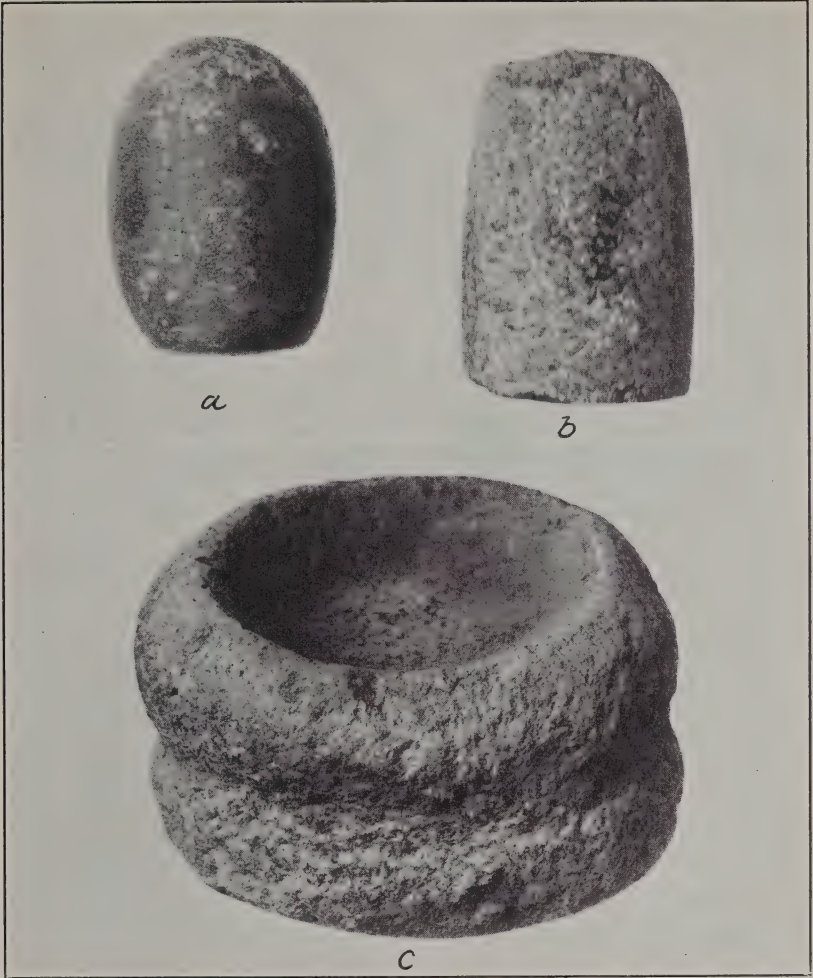
AX HEADS



JAR STOPPERS AND ARROW-SHAFT SMOOTHERS

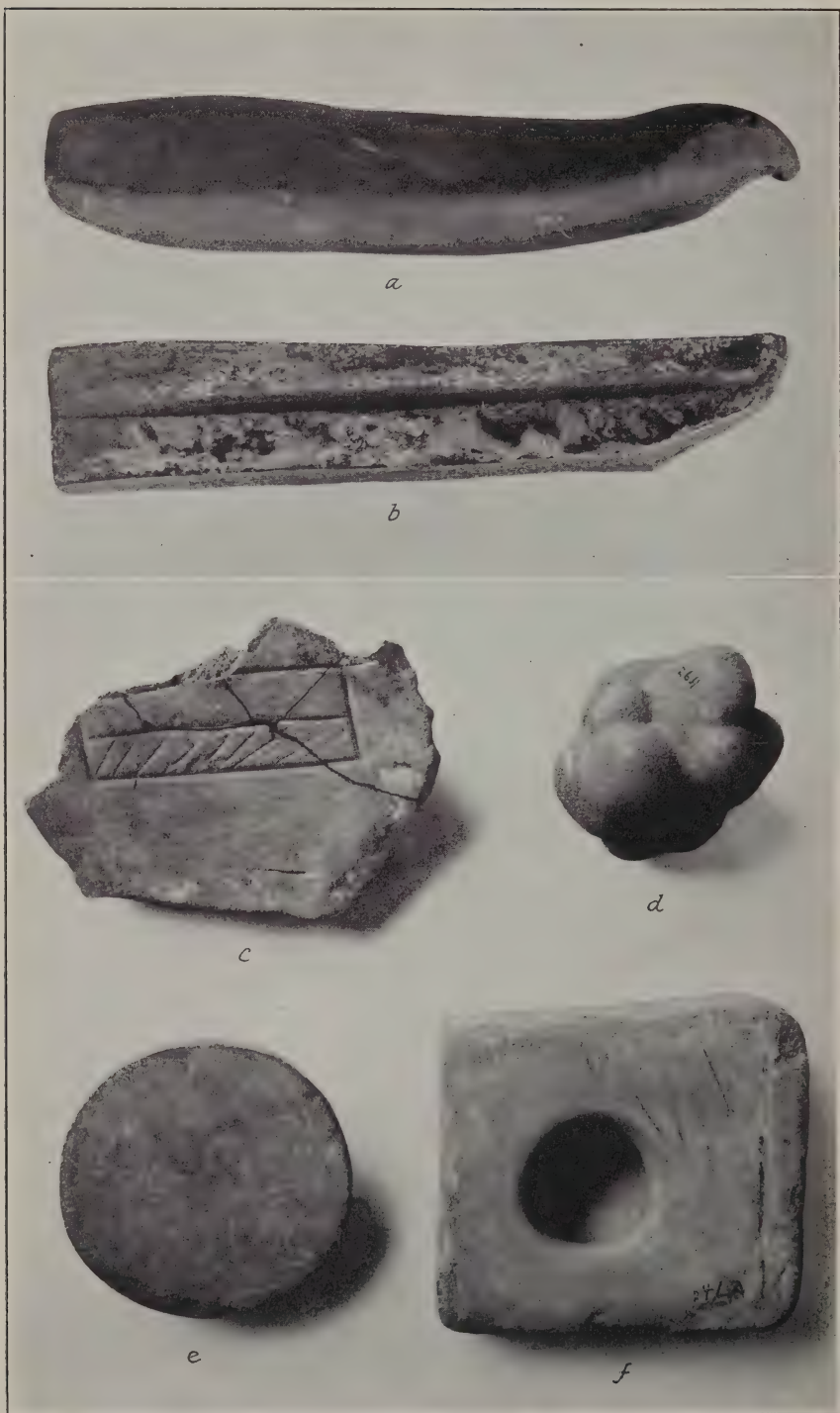


PAINT MORTARS



STONE OBJECTS

a, b. Small pestles for grinding paint; *c*, paint mortar; *d, e.* Corn goddess symbols



MISCELLANEOUS STONE OBJECTS

a, Ceremonial figure; *b*, bead polisher; *c*, decorated slab; *d*, concretion fetish; *e*, sipapu cover; *f*, sipapu.

interesting because the pigment adhering to the surface in the larger one is red while that in the smaller is black.

The two rounded conical objects *d* and *e*, Plate 55, are what is known as corn-goddess symbols and have considerable ceremonial significance among the present-day Hopi and Zuñi. The Hopi call them the Idols of Alosaka or Muyinwu, the germ gods which are supposed to cause the corn to germinate when it is planted.⁶⁷ The Hopi place such objects on the altar during the performance of the Powamu ceremony, the festival for the purification and renovation of the earth, which is held in February of each year. According to the Zuñi, stones of this type represent the corn goddess or mother of all corn and if placed in a field where that grain has been planted will assure a bountiful crop. Similar stones have been found in other prehistoric sites. Fewkes secured several on the Mesa Verde,⁶⁸ and also obtained examples from ancient ruins in the Hopi country. The stones themselves are very simple in form, as may be observed from the photograph. They were fashioned from sandstone blocks by the pecking and rubbing method. In shape they suggest in a very general way the end of an ear of corn. One feature which they possess is not shown in the photograph; that is a concavity in the bottom which makes it possible to place small offerings, such as turquoise and bits of shell, under them. This shallow cup is not always present on the object but occurs fairly often. These two specimens, it will be recalled, were found in kiva A of house A. Other examples were found throughout the village. One came from the single room excavated in the small house south of the great kiva, while two were dug out of house B and several others turned up in the dump heaps.

A long, flat object with a beaklike projection at one end (pl. 56, *a*) was found in the refuse mound near house B. It undoubtedly functioned in a ceremonial capacity, but what its actual purpose may have been is not known. Similar stones are used by the present Zuñi in some of their ceremonies to represent certain anomalous mythological birds. In the Zuñi kiva an object of this type is placed on a line of meal extending out toward the center of the room from the altar at one end. A similar practice may have been in vogue at the time this village was occupied and the present stone used in that way.

The second stone, *b*, Plate 56, is characterized by a long, narrow groove extending its entire length along the center of one side. The stone was probably used in the shaping and polishing of beads. Practically the only difference between bead polishers and arrow-shaft smoothers is one of length and regularity of groove. Some

⁶⁷ Fewkes, J. W., 1916 *b*, pp. 111-113.

⁶⁸ Fewkes, J. W., 1911 *b*, p. 67; 1916 *b*, pp. 96-117.

of the present-day Zuñi use almost identical stones in making their beads.

Fragments of stone were sometimes ornamented with geometric patterns scratched in their surfaces. An example is illustrated by *c*, Plate 56. What the significance of these stones may have been is not known. They generally are small, irregularly shaped slabs, whose edges have not been worked and whose flat surfaces show no signs of preparation, the only workmanship on them being that in the design. None of these objects was found under conditions implying any ceremonial significance, and as a consequence it does not seem quite logical to attribute such function to them. Merely as a suggestion, an explanation from the standpoint of purely utilitarian aspects may be offered. The people were continually sharpening and resharpening the points of their bone implements, and stones bearing evidence of such activity are frequently found. They generally have an unrelated series of grooves on one or more faces. In many instances these grooves are quite like those which form the patterns on the decorated pieces. In view of this similarity and taking into consideration an inherent artistic quality found in occasional individuals, it may be suggested that such persons at times worked out a pattern instead of making a series of aimless scratches in their tool-shaping endeavors. If such were the case no ceremonial qualities need be postulated to explain stones like the one pictured.

The two specimens *e* and *f*, Plate 56, are the sipapu and its cover from kiva A, house A. The circular disc which served as a lid was made from a piece of slate. It was well dressed and carefully smoothed and made an ideal cover for the sacred hole in the floor of the ceremonial chamber. The block of stone, with a perforation through its center, which was embedded in the floor to form the symbolic place of emergence, is sandstone. It was roughly shaped, but the edges were not as carefully smoothed as those of the lid. The hole through the center is not cylindrical in form but funnel shaped. The diameter of the orifice on one face is considerably larger than that of the other. The stone was placed in the floor, with the smaller opening uppermost. The use of a perforated slab to form the sipapu is not uncommon in this region. Some of the present-day kivas in the village of Zuñi have just such sipapus. Hodge also found an example in one of the circular kivas near Hawikuh.⁶⁹

Stones in their natural, unmodified forms were also employed for various purposes. Many odd-shaped concretions served as fetishes, charms, and lucky stones. Perhaps an occasional example was collected and saved solely because its unusual shape appealed to the fancy of one of the Indians. In other cases they may have sug-

⁶⁹ Hodge, F. W., 1923, pp. 15-16, Pl. VIII, *a* and *b*.

gested some animal or bird and for that reason appealed to the superstitious side of their collector's nature. An example of the kind of concretion frequently treasured by present-day Zuñi is shown in Plate 56, *d*. These are thought to be portions of the gods, of their weapons, implements, ornaments, and often are considered the wherewithal of being. The form illustrated in the photograph is usually considered representative of the genital organs of some ancient person and is highly prized not only as a means of approaching the spirit of the particular god but also as an aid to a young man in his conquest of women and to a young woman in helping her to bear male children.⁷⁰

Smooth stones and pebbles were used to smooth and polish the surfaces of pottery vessels. The main distinguishing features of such objects are the high gloss which they have taken on as a result of long use and the fine striations or scratches which constant rubbing over clay surfaces produces. A typical group of stones of this class is illustrated by Plate 57.

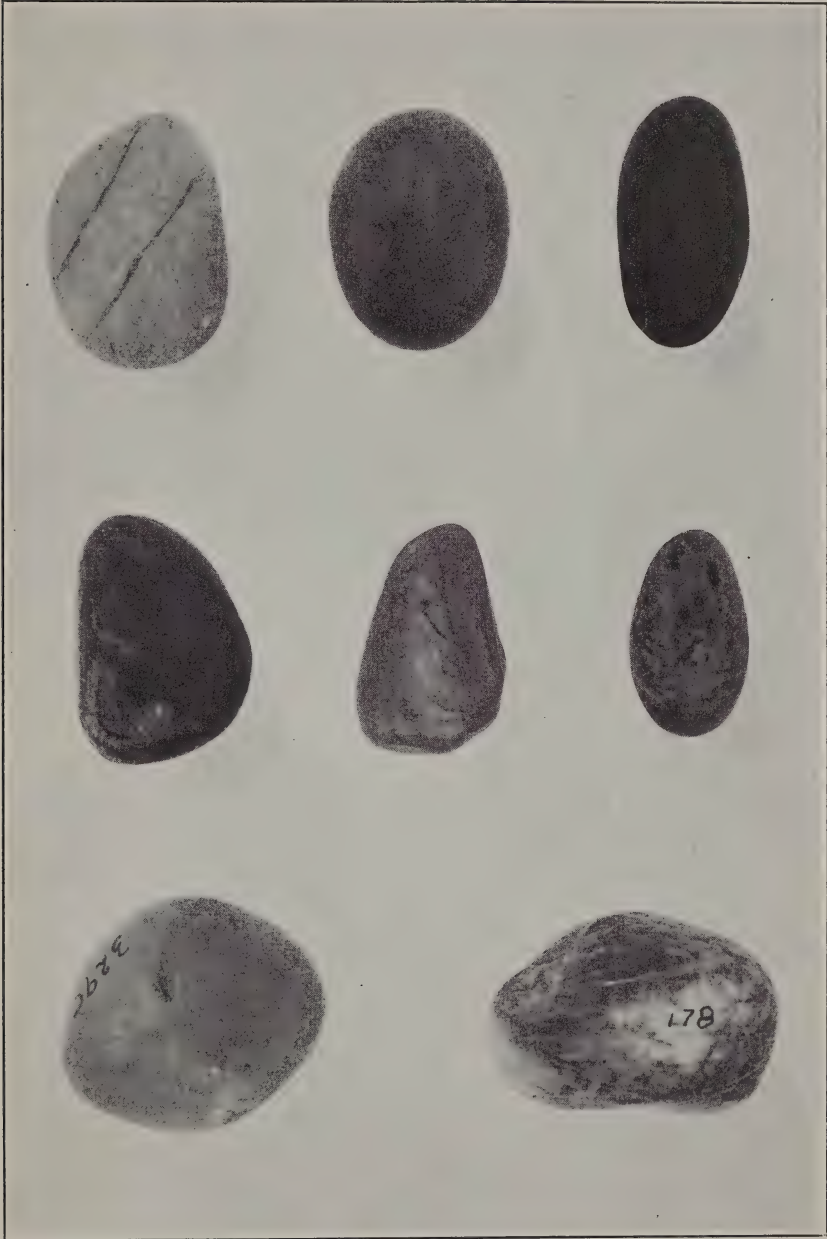
Chipped implements consist of spearheads, knife blades, and arrow points worked from flakes of chalcedony, jasper, chert, and obsidian. Only a few examples of this class of stonework were found. Why there should have been such a paucity of specimens of this nature is a question which can not be answered, but one, nevertheless, which was probably of some significance. A similar lack was found in the pueblo on the Long H Ranch, and ruins throughout the Zuñi district do not furnish the numbers of arrowheads generally picked up around such sites. Examples of knife blades are illustrated by the specimens in Plate 58. The three varieties pictured represent the types found. Judging from the material, no one form was predominant. They seem to have been made in about equal numbers. The long slender blade *b*, Plate 58, is of particular interest because an attempt was made to remove a longitudinal flake down the center on one side. The maker was only partially successful, as the flake broke off midway along the blade. From the standpoint of the craftsman this probably was an unfortunate circumstance, but from that of the archeologist it was an opportune break. In its incompleteness the blade shows clearly that the attempt to remove the long central flake was not made until after the stone had been shaped to its desired form. This might not have been so easy to determine had the maker been successful in his efforts. The removal of a longitudinal flake from the center of the blade is one of the characteristics of the Folsom points found in association with an extinct species of buffalo. The present specimen should not be considered as an example of a Folsom point, however, as it differs in other respects.

⁷⁰ Cushing, F. H., 1883, pp. 44-45.

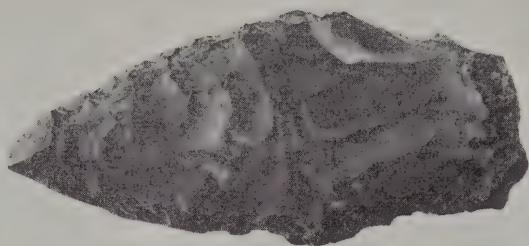
Not many arrowheads were found, but all are of the same type of point. All are notched and have a broad, squared tang. The notches were placed at right angles to the long line of the blade and formed small barbs and a tang. The tang is as wide as the widest part of the blade and has a straight base. None of the concave or convex forms were found at this location. The chipping on the specimens does not show any special degree of excellence. The flakes were struck off from nodules of chalcedony, chert, and obsidian. The heads were shaped by removing chips along the edges. The chips were rather large, and the edges are somewhat serrated as the result. No examples illustrate the fine, minute chipping which was characteristic in some localities. The arrow makers seem to have been content to produce an efficient weapon without taking the time or expending the effort necessary to make the more finished types of head. (Pl. 59, *a-e*.)

Spear points have an even smaller percentage in the collection of specimens than do the arrowheads. Only a very few examples were found, and some of these might by some be considered knife blades rather than spear points. Three different forms are present. One has a rather broad, heavy blade, with small barbs and a short, heavy tang. (Pl. 59, *f*.) The size of the barb varies slightly on the points of this type, but in general they are quite like the example illustrated. The second form of spear point consists of a long, rather narrow blade without barbs, notches, or tang. (Pl. 59, *g*.) Means for attaching these blades to the end of the shaft was provided by the slight tapering near the base end. The widest part of the blade occurs at a distance of approximately one-fourth of the total length of the object from the base. From there the sides taper to the point. The third form of spearhead consists of a comparatively long and broad blade with barbs and a narrow, short tang. (Pl. 59, *h*.) The line from the barb to the tang on these specimens runs approximately at right angles to the long axis of the blade. There is an almost imperceptible obliqueness on some of the examples which gives the barbs a down-raking appearance. The sides of the tang are slightly concave, so that the base is somewhat wider than the shaft. The base of the tang has a tendency to be convex, but this feature is not pronounced.

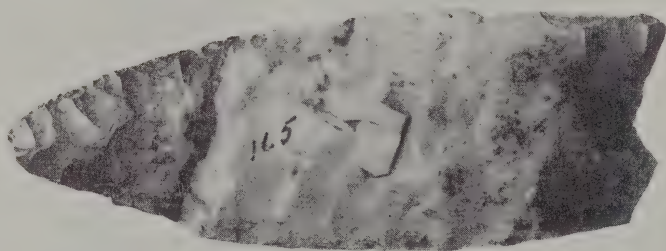
Ornaments made from stone were not numerous. The collection contains only a few specimens, consisting of beads, pendants, and fragments from inlays. The beads are all of the flat, tubular variety (pl. 59, *i*) and were made from a rather soft white stone which is known as southwestern alabaster. Some of the pendants were also made from this same material. Ornaments of this class consist of round or oval disks with a perforation at one side so that they could be suspended from a necklace. (Pl. 59, *m, o*.)



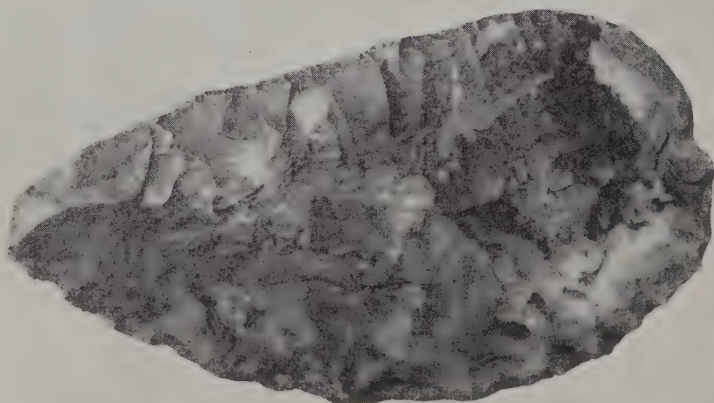
POLISHING STONES



a

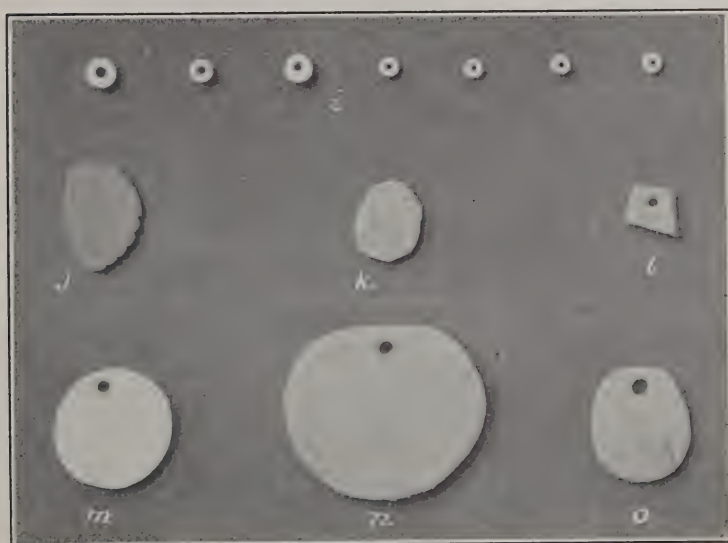


b



c

CHIPPED BLADES



ARROWHEADS, SPEAR POINTS, AND STONE ORNAMENTS



a



b

HEADS CARVED FROM STONE

a, Snake; *b*, unidentifiable animal.

Pendants were also made from a red ferruginous shale. Approximately the same shapes are to be observed in this group as in the preceding. An example is illustrated by *n*, Plate 59. For some reason or other turquoise was practically absent from the site, only a few unworked fragments being found. There were no beads or pendants made from the material. This condition is rather strange when it is considered that this particular stone was held in high favor among the Pueblo people. Sites of a slightly later date in this region yield considerable amounts of it and the Chaco area to the north, from which region the first group of settlers in the village are supposed to have come, is noted for its beads and pendants. Why the people here did not have such ornaments would probably make an interesting story if the facts in the case could be known, but unfortunately all that can be done is to call attention to their absence.

One of the most interesting of the groups of stone objects is that of the heads. They were carved from blocks of sandstone and indicate a rather high degree of artistic talent on the part of their makers. It is not possible to tell in each case what creature is depicted. This may be due to the fact that they were intended to represent mythological as well as actual beings. They no doubt served as fetishes for use in ceremonies, but in just what manner they were employed is not known. In every instance the features of the head are quite well defined, but the neck consists of an unfinished cylindrical stem and there is no indication of the rest of the creature. For this reason it is thought that they probably were mounted on bodies fashioned from some perishable material. The slight groove present on the stem just back of the actual head would provide a suitable means for attaching the body. A string or thong tied around the stone at that point would hold the pliable material, from which the rest of the creature was made, firmly in place.

One of these heads unquestionably represents a plumed serpent. (Pl. 60, *a*.) The features are very suggestive of those on the plumed serpent used in some of the more important ceremonies at Zuñi. The Ko'loowisi, as it is called by the latter, is one of the important underworld gods having to do with the giving of water, seeds, and grass. When this god participates in various ceremonial performances a figure made of deerskin is used. It has a body between 5 and 6 feet (1.524 and 1.828 m.) long. The back is painted black and bears half-moon symbols in yellow and blue-green to designate the scales; the underside is painted white. A cottonwood stick placed in the body makes it rigid and symbolizes the backbone. Ribs are fashioned from cottonwood and extend from the neck to the posterior end at regular intervals. The head is made from a gourd and tied to the deerskin body, and the throat is wrapped with a fox skin to

hide the joint. A group of plumes rises from the head.⁷¹ A similar form of body may have been used by the prehistoric people and a stone head employed rather than one fashioned from a gourd. As will be observed from the photograph, a distinct row of teeth is indicated along the lower jaw. The present-day serpent head used at Zuñi has pronounced teeth on both jaws. Two holes indicate the nostrils and there are two for the eyes. At the top of the head are two projections. In both instances the upper portions have been broken off so that it is not possible to determine their original extent. They undoubtedly represented the plumes or perhaps furnished a base to which actual feathers were attached.

The second head pictured in Plate 60, *b*, is one of the best preserved in the entire group, but one which it is difficult to identify. In some respects it suggests a parrot and in others a deer. Both play prominent parts in certain phases of the life of the present-day Zuñi. For this reason it might be either so far as the ceremonial side of the matter is concerned. It would seem, however, that it is more suggestive of a deer or antelope than a bird, despite the beak-like character of the snout. The eyes are represented by holes. At either side and just above them are small knobs indicative of horns and at the back are the broken bases of what may have been the ears. What the purpose of the deep parallel grooves just below the eyes on each side of the head may have been is not known. They may represent the markings on an animal or have had some significance from a ceremonial point of view. The deer and the clan named after it plays an important part in certain rituals among the modern Pueblos and may well have done so in the past. This head was found in kiva A and must have been of some ceremonial importance.

The frog is no doubt represented by one of the carved heads, Figure 34, *a*. This creature plays an important part in the mythology of the Zuñi because of its association with rain and moisture. The present-day people unquestionably regard it in this light because of beliefs and myths handed down from the past and the dwellers in the Village of the Great Kivas may well have attached considerable ceremonial significance to it. At the present time members of the rain priesthood at Zuñi keep fetishes made from four hollow reeds, all of which are filled with water. The largest one also contains a small live frog (really a toad but called frog by the Zuñi). Bowls used in certain ceremonies have frog symbols painted on them or are ornamented with bas-relief figures of the creature. In the rain ceremonies certain songs which are believed to be efficacious in the bringing of moisture are sung by a member of the Frog clan. In view of these facts it seems logical to conclude that the frog head

⁷¹ Stevenson, M. C., 1904, pp. 94-95, 101.

found in the ruins may have been for use in rituals consecrated to the rain gods, or was the fetish of a water clan, or both. The second head (fig. 34, *b*) also suggests a deer or antelope. In this case, however, the resemblance is more striking than in the case of the one previously described.

There may be no particular significance in the presence of these stone heads and the creatures which they represent, but it is interesting to note that at the present time there are, or recently were, clans at Zuñi which bear names similar to those suggested by the objects. It is possible that the inhabitants of this village were antecedents of the deer, or macaw (if the first head described is so interpreted), snake, frog, and antelope people. It would be interesting to pos-

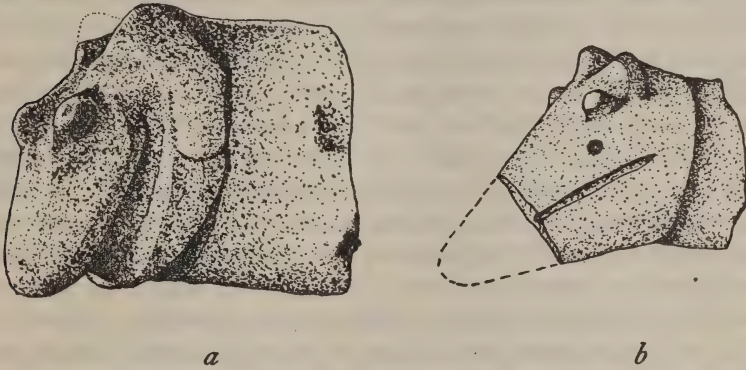


FIGURE 34.—Stone heads

tulate further along this line, but there is not sufficient evidence to warrant more than the suggestion of such an occurrence.

PETROGLYPHS

The artistic talents of the inhabitants of the Village of the Great Kivas found expression in other ways than that of ceramic decoration, bonework, and carving in stone. Additional examples of their handiwork are to be found scattered along the face of the cliffs back of house A in the form of large numbers of figures pecked into the rock. They occur singly and in groups. The symbols include both geometric and life forms.

There has been considerable comment and argument over the meanings of petroglyphs and the extent to which they may be regarded as symbolic of definite things associated with the life of the Indian. Many writers in the past have sought to endow them with the qualities of a written language and have read far more into them than they logically should. Others have gone to the opposite extreme and have dismissed them with the statement that they were aimless drawings executed at idle moments and as such were held to be meaning-

less. The chances are that both were right and both were wrong. In some cases the symbols no doubt have a definite meaning, while in others they probably were done merely to pass away the time and give vent to a certain artistic urge. In the following discussion Zuñi explanations and interpretations will be given. In some cases these are quite logical, while in others they are rather far-fetched. Whether their meanings are the ones which the prehistoric people had in mind or whether they are entirely removed from the original conception no one can tell. The Zuñi interpretations are more in keeping with the Indian point of view, however, and for that reason are presented as a suggestion of what the drawings may possibly have stood for.

Just east of house A, in a sheltered spot well up on the side of the rocks, is a group of drawings representing several insects. (Pl. 61, *a*.) According to the Zuñi, the first figure is that of the centipede, called Sho'lah; the second, a scorpion, Kia'te'tsi is their name for it; the third was not completed and could not be identified; the fourth is some kind of ant, about which the informants were rather hazy but which they unhesitatingly called Pe'nommeh; the fifth is another centipede figure. All of these insects are endowed with more or less poisonous stings and their likenesses, according to the modern Zuñi, were placed on rocks as a part of rite during which the gods were called upon to wreak vengeance upon their enemies. When a war party was away from the village in pursuit of the Navajo, or on its way to attack them, the war priest in charge of the warriors had a song which he sang at night in which he petitioned various animals and insects to bite and torture his enemies. During the course of the song he drew pictures of each insect as he called upon it to sting the object of his incantations. It is not known whether the ancient people had such a custom or not, but it is not at all improbable, and the present example may be the record of just such an occasion.

At another place on the rocks to the east of the village is a group of figures of which only a few are sufficiently well preserved for identification. Even in the case of the latter it was necessary to fill in the outlines with whiting before photographing them. The three main figures in this group consist of a conventionalized horned toad, an unidentified insect, and one of the humpbacked flute players. (Pl. 61, *b*.) The latter are found in widely scattered sections of the Southwest and no doubt had some marked significance. The Zuñi say that the figure represents a rain priest and that he is pictured on the rocks for the purpose of attracting clouds and moisture to that vicinity. The horned toad or lizard and insect figures accompanying him are supposed to aid this bit of magic. They call the flute-player figure Chu'lu'laneh, the name for the type of flute used by the rain priests. They were not sure what the other figures should be called.

The largest group of rock pictures is located north of house A, on the face of the cliff just above the top of the talus slope. There are numerous geometrical symbols in this group as well as life forms and conventionalized figures of living beings. (Pl. 61, *c.*) As will be observed from the photograph, there are spirals, zigzag figures, representative both of lightning and the snake; insects, the outline of a human hand, deer, possibly the mountain sheep, spiral symbols with legs, tadpoles, another humpbacked flute player, and in addition a number of indefinite scratches and aimless marks. Spiral figures are to be observed elsewhere along the rocks. (Pl. 62, *a.*) This symbol is frequently interpreted as being a water sign, but the modern Zuñi say it refers particularly to the period when, as their migration myth relates, the ancients were traveling about in search of the center of the world so that they might settle down and build their permanent home. Their designation for this symbol is Al'olowish'keh. The figure of the deer shown in this same photograph is a record, so the Zuñi say, of an unusually successful hunt and the killing of many animals. It was placed there in order to propitiate the spirits of the slaughtered animals and to attract others to the region. The figure at the lower right-hand side is undoubtedly that of a turtle, Et'towa by name. The turtle is also important in the minds of the Zuñi because of its connection with water. It appears in a number of places in their creation myths.

The figures illustrated in *b*, Plate 62, are particularly interesting because part of them refer to a definite folk tale. The two symbols at the lower left-hand portion of the photograph are recent. The one at the extreme left is the sign for growing corn and that slightly above and to the right of it is a Zuñi cattle brand. The rest of the group constitutes a unit. The drawings are not prehistoric, although they are old Zuñi. They refer to one of the incidents in a folk tale which is commonly told to the children. At the upper right-hand corner are the symbols for the new moon and the evening star, and at the lower left is a figure of an owl. The zigzag line extending from the moon and star to the owl is supposed to trace the flight of the bird. The story to which it refers is one which the war chief tells. It relates how in ancient times the owl would occasionally come to the war chief and tell him where Navajo hogans were located. The bird would lead the chief to the houses of his enemy. He would then don a headdress of piñon jay and quail feathers, the latter making him invisible, and enter the hogans where the Navajo were sleeping. After he had counted the number of sleeping forms he would return to Zuñi and gather a group of warriors together and go and capture the Navajo or steal their belongings. The owl did not always favor the Zuñi, however, as sometimes he would fly on

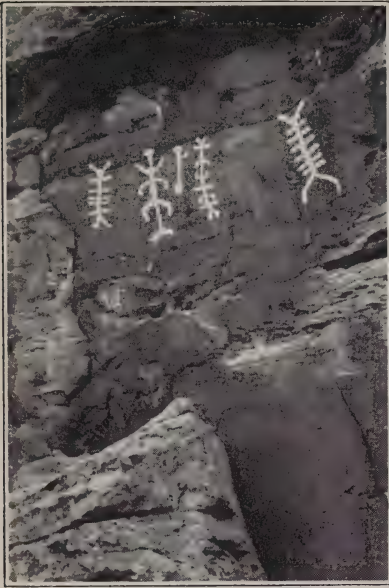
ahead and warn the Navajo that their enemies were coming, and when the Zuñi arrived they would find a deserted hogan.

The rock drawings illustrated in Plate 63, *a*, are unusual, especially the row of dancing figures. None of these figures suggests either the work of the prehistoric people or of the modern Zuñi. They are not recent, as the pecking shows definite signs of age, but they may belong to the old modern period. The full-faced figure with headdress is a Navajo sun symbol and it is possible that the dancing figures are of the same origin. The three symbols in *b*, Plate 63, are not as well done as some of the others. The one at the upper right-hand part of the photograph is a good example of the deer. The figure just below it is made up of a series of turkey tracks. Why they were attached to the straight lines is not known. The lower left-hand figure is that of a man, according to the Zuñi, but was not finished. These three drawings are on the same rock as those illustrated in Plate 61, *c*. In the latter picture they are at the extreme lower right-hand corner.

HUMAN BURIALS

The inhabitants of the Village of the Great Kivas buried their dead for the most part in the refuse mounds located at various points around the community. In a few cases the remains were interred in the native earth outside the bounds of such deposits and in a single instance the body had been placed in an abandoned fire pit, or rather an oven, the pi-gummi oven previously described. A few infant burials were found close to outdoor fire pits. This practice was comparatively frequent throughout the Southwest, as many sites have furnished examples of the custom. It is possible that it is a record of a local adherence to a belief that was widespread among peoples of that degree of culture throughout the world. That is, the deep-rooted conviction that the family circle could be kept unbroken, even in death, by burying the deceased close to the hearth. This belief has been observed among the modern Pueblos and apparently was quite prevalent in some of the late prehistoric centers, also to a lesser degree in older horizons, as the dead were frequently buried beneath the floors in the houses.

Sixty burials were uncovered during the course of the investigations. The location of these interments with respect to the dwellings and other features of the village is shown by the numbered dots on the plan of the ruins. (Pl. 1.) There were certain features about the burials which may be briefly summarized. Twenty-four graves out of the total contained the bodies of infants and young children. The 36 adult remains comprised 12 males, 16 females, and 8 which were too indefinite in their characteristics to permit the determina-



a. Insect figures



b. Insect, lizard, and humpbacked flute player



c. Group of geometric and life-form symbols

DRAWINGS ON ROCKS



a. Spiral and zoomorphic figures



b. Ancient and modern symbols

PETROGLYPHS



a. Dancing figures and sun symbol



b. Deer and unknown figures

CARVINGS ON ROCKS



TYPICAL BURIALS

tion of the sex. Although there was a fairly large number of child burials it does not seem likely that the number represents all of the deaths for that group in the village. Infant mortality among the present-day Pueblos is quite high and probably was as great, if not greater, in the earlier periods. Hence it would seem that there should have been a greater proportion of such remains than actually was found. It is quite probable that the bones of many of the infants did not withstand the agents of decay as well as those of older children and adults. For that reason the burials seem to indicate a lower death rate for children than for the adults, when the reverse was probably the actual state of affairs.

The customary position for the body, in all cases where it was possible to tell from the remains, was the flexed or contracted. (Pl. 64.) The lower legs were drawn tightly against the thighs and the knees were either at right angles or close to the body. In some instances the arms were folded across the chest, in others the hands were placed beneath the head, and again they were extended along the sides with a slight bend at the elbow. There was some attempt at orientation; 35 were placed with the head to the east; 5 had the head slightly north of east; and 6 were interred so that the head was a little south of east. In general it may be said that 46 out of the 60 had the head placed in an easterly direction. Of the remaining group, 2 had the head to the west; 2 to the south; and in 10 instances, largely infant burials, the bones were too decayed to make an accurate determination of the body direction. From the standpoint of the side on which the body was placed, the left seems to have been the favored one, as 34 were found in that position, 7 had been placed on the right side, 6 were lying on the back, and 1 was face downward. Twelve were too badly preserved to tell just what the exact position had been.

Mortuary offerings were placed in most of the graves. The commonest were pottery vessels, although an occasional stone or bone implement accompanied the remains. In a majority of the graves the offerings were placed near the upper end of the body. To be specific, in 37 cases they were at the head, and in 12 were near the shoulders. Just two examples were found where the pottery was at the feet, and in both of these the head was to the west. Because of this, and taking into consideration the prevailing easterly direction for the head and the fact that in more than half the interments the offerings were near it, the suggestion may be made that in the case of the two exceptions the body bundle may inadvertently have been turned around when it was being carried to the grave and as a consequence the offerings were placed at the feet with the thought that they were being deposited at the head. One burial had the

pottery at the knees. In one instance it was placed above the body, and seven had no offerings of any kind.

The grave itself in most cases was a rather shallow hole scooped out in the refuse mound or earth. The depth of the bodies beneath the surface ranged from 1 foot 6 inches (45.72 cm.) to 3 feet 6 inches (1.066 m.); rarely as deep as the latter. Twenty-eight had simply been covered with earth, 18 had a layer of rough stones over them, 10 were covered with worked slabs of stone, 2 were found lying on a stone slab, and 1 had been placed between worked slabs. The remaining burial was in the pit oven previously referred to. Nowhere was there any indication to suggest that the inhabitants had practiced cremation. If an occasional body was burned the remains were more thoroughly consumed by the flames than is usually found to be the case where such a method prevailed. Consequently it would seem that inhumation was the sole method of disposing of the dead.

The skeletal material was in rather poor condition, and for that reason an extended study of the various features was not made. Certain significant things stand out, however, among them being cranial deformation. In every case where enough of the skull was present to show the occipital region a pronounced flattening was observed. This shows that the people constituted a typical Pueblo III community. In size they fell well within the average for the Pueblo peoples.

An occasional individual shows traces of having suffered from rheumatism or arthritis. This occurred most frequently in the middle aged and aged individuals. An occasional fracture of an arm or leg bone was present, but in most cases they had healed before the death of the individual. Two of the adult male crania showed depressed lesions suggestive of blows which may have been received during an altercation or as a result of participation in some phase of warfare.

The most noticeable physical defect was that of decayed teeth. Many of the adult crania had caries in the molars and bicuspid. All showed considerable wear and an occasional broken tooth was observed. In the group of elderly people extractions seemed to have been common and practically every skull of a middle-aged and older person which was sufficiently intact to show the teeth had two or three bicuspid and molars missing. Two aged females had no teeth at all and the bones showed distinctly that the teeth had been lost some time previous to their deaths, because the alveolar processes had completely grown over. It would be interesting to know what method the people used in extracting bad teeth, but nothing was found to indicate the kind of implements used. It may be that they, like some of their modern descendants, placed the end of a stick against the aching member and dislodged it by means of a sharp

blow struck at the outer end with a stone. In some cases the individuals may have suffered from pyorrhea to such an extent that the teeth were loose and easily removed. Pyorrhea was fairly common among the Indians.⁷² The poor condition of the teeth may have been due to a deficiency in diet. The people no doubt had sufficient vegetable food, but judging from the amount of bones found in the refuse their supply of meat was not as plentiful as might be desired from the standpoint of proper nutrition.

There is no way of knowing just how long the village was occupied or how many people lived there. On the basis of the present-day Pueblos it is possible to make a rough estimate of the population. If all of the buildings were occupied at one time the population may have reached as many as 150 inhabitants. Investigations in the dwellings themselves, however, have tended to show that portions of house A were abandoned and used as dump mounds, consequently a certain allowance must be made in estimating the number of people living there. Out of the total of 64 rooms the largest number occupied at any one time was probably 51. If house B was inhabited at the same time that would make a total of 71 occupied rooms for the two buildings. Estimating three rooms to a family, with an occasional group using four, it may be said that 20 to 22 family groups, in this case referring to father, mother, and children, constituted the community. The average family, judging from present-day groups, probably numbered about five. This would give a total of 100 to 110 individuals as a maximum. The number 100 probably more nearly represents the size of the group than the larger one, and that only for the latter part of the life of the village.

On such a basis 60 burials would indicate a fairly long period of occupancy. Nothing is known of the average annual death rate among such groups, but records from European countries have shown that in the more barbaric stages of culture the yearly deaths per hundred range from 3 to 4. In his study of the skeletal material from Pecos Doctor Hooton estimated that the average annual death rate per hundred for that pueblo from the date of its founding down to 1700 was slightly under three.⁷³ If this same figure is taken for this village it may be postulated that the site was occupied from 15 to 20 years. Judging from the amount of debris in the refuse mounds and the changes which took place in the village it would seem that this is a fair estimate for the life of the community. It should be borne in mind, however, that the group was probably not as large during the early phase in the building and development of house A, hence it is possible that a few years should be added to the

⁷² Hooton, E. A., 1930, p. 369.

⁷³ Hooton, E. A., 1930, p. 333.

length of occupation. On the other hand, the number of burials found probably does not represent the total losses to the community, and for that reason would offset the variation in the number of inhabitants. The foregoing is largely speculation and should be regarded as such, but it seems a conservative estimate to say that the village probably numbered around 100 people and was occupied for a period of from 15 to 20 years.

AGE OF THE RUINS

One question which naturally arises with respect to a group of ruins which have been excavated is that of its age. The archeologists and people in general are always anxious to know when a place was built and occupied. Many times this information can only be obtained from comparative sources, such as the indication of trade pieces which come from a dated site or by approximation on the basis of stratigraphical material extending back from some known horizon. In the case of the present village, however, fragments of burned beams were salvaged from various parts of the ruins and sent to Dr. A. E. Douglass. On the basis of the latter he was able to give a date 1015, plus or minus 15. In other words, the ring evidence from roof timbers used in the houses shows that the structures were built and occupied during the interval between 1000 and 1030 A. D.

This is particularly significant from several standpoints. It will be recalled that in the introduction to this report the dates 950 to 1200 A. D. were given for the main phase of the classic era, the ascending stage of Pueblo III. From this it will be noted that the village of the great kivas belongs to the early part of the horizon. What is even more important, however, is the fact that the building of the houses coincides with certain activities farther north. The beam material from Pueblo Bonito in the Chaco Canyon indicates a period of constructional activity at approximately the same time. Additions to that center were made in 1017, and during the interval from 1033 to 1092.⁷⁴

There has been more or less question concerning the great kivas in the Chaco Canyon. They unquestionably were erected during activities subsequent to the original building program, but just where they fitted in has proved a problem. The evidence from the present site with its two great kivas suggests that the superceremonial room at Pueblo Bonito belongs to the same phase of development, the expansion age of the early eleventh century. In so far as the Chaco Canyon and its history is concerned another salient factor

⁷⁴ Douglass, A. E., 1929, p. 743.

becomes involved, namely, the period of notable growth at that culture center coincides with a marked increase of population which evidence indicates was probably due to an incoming wave of immigrants. The latter no doubt constituted the beginning of the movement which culminated in the eventual abandonment of the centers in the Montezuma Valley-McElmo district in southwestern Colorado, the growth of the Mesa Verde center, and the development at Aztec, N. Mex., events preceding and leading up to but not to be confused with the ultimate collapse of the northern frontier.

Closely associated with the movement in question is the problem of the spread of the great kiva. The discussion of such structures in the consideration of great kiva No. 1 suggested that the type attained its greatest refinement in the southwestern Colorado district and was introduced into the Chaco region. Such a conjecture agrees quite well with the other factors involved in the spread of peoples over the area. On the other hand, a different point of view, and one with certain justification to be sure, is that there was an expansion of the Chaco culture at an early date over a region of considerable extent. This was followed by a contraction and return to the main center when conditions in the outlying provinces became too severe. As might be expected under such conditions, villages in the more remote districts while retaining most of the parent traits would tend to develop some distinct features of their own. They also might obtain new ones as a result of contact with outlying groups from another center, and upon returning to the original home would conceivably introduce some of the variant traits. Regardless of which of the foregoing theories is accepted as a possible explanation for conditions, there seems little question that the great kiva was a northern development and that the first group at the Nutria Canyon site was from that region. They may have come from the Chaco itself or have migrated from one of the more northern places which was a provincial outpost dominated and characterized by that center. They certainly carried many of its traits. There is the possibility, of course, that a local group living in the Zuñi region had come under an influence from the Chaco and that the idea of a superceremonial chamber was transmitted to them. Such structures were so specialized, however, and features associated with them are so typical that it seems that they would only be erected by people already familiar with them. In addition to this, there are no indications in this immediate vicinity of an earlier group. Hence the conclusion that the builders must have come from the north and brought their architectural practices with them.

SUMMARY AND CONCLUSIONS

Investigations were conducted during the summer of 1930 in a group of ruins located at the mouth of Red Paint Canyon on the north side of Nutria Valley, 16.7 miles (26.875 k.) from the village of Zuñi, on the Zuñi Reservation in western New Mexico. They demonstrated that there had once been a settlement composed of three communal dwellings and two great kivas or superceremonial structures at that place. The accumulated débris was completely removed from two of the houses and one of the great kivas. Only one room was excavated in the third house and examination of the second large ceremonial structure was restricted to tracing its walls so that its size could be determined and its position properly plotted on the map.

The largest of the dwellings was a house containing 3 small ceremonial chambers, a great kiva, and 64 rooms, 60 of which were on the ground level while the additional 4 constituted a second story. In addition, there were four detached subterranean ceremonial rooms in the earth in front of the east end of the structure. Evidence was that the building had not been erected as a unit but had grown as the result of several periods of constructional activity. The original structure was a rectangular block of 13 rooms and 2 small ceremonial chambers. Subsequently five more rooms and the great kiva were added. Accompanying this was a certain amount of remodeling in the original rooms. The building was occupied for some time in that form, when considerable changes were brought about by a landslide which forced the abandonment of several rooms and the building of new ones to replace them. The new addition consisted of 15 rooms placed at the east side of the great kiva and south of the original block. Furthermore, two of the older enclosures were remodeled into a small ceremonial chamber to replace the one vacated because of the falling rocks from the cliff behind the structure. Up to this point in the growth of the village the house type was predominantly Chacoan in character. With the adding of the east and west wings; the construction of new chambers over the refuse-filled rooms which had been abandoned after the landslide; the incorporating of enclosures in other portions of the building, a total of 31 new chambers; and the placing of the 4 small kivas in the earth in front of the structure, a new element appeared. The masonry in these later portions was different from that of the earlier sections and the shapes of the rooms were more irregular.

Features of construction which suggest the type of architecture associated with the Chaco Canyon cultures are the plan of the older sections; previous to the addition of the east and west wings; the method of wall construction, in which courses of large stones were

separated by layers of small ones; the size of the rooms, and their ceiling height. The east and west wings were characterized by their irregularity of outline, the poorness of the masonry in the walls, and their lack of size. In this connection it was suggested that the poorer quality of workmanship evident in the wings might be the result of a cultural breakdown in the group living in house A, but such did not seem to have been the case. The marked increase in the number of rooms in the dwelling which these additions brought about, together with the evidence that many of the older chambers continued in use, indicates a decided enlargement of the community. This growth was too rapid and covered too short an interval to be accounted for on the basis of natural increase. Consequently it is thought that the original settlers, who in all likelihood came from the north, were joined by a new group migrating into the district in small parties. Because of the type of masonry and the character of some of the lesser objects of the material culture, it is believed that these later people came from the south, possibly as a backwash up the Zuñi River of a migration down the Little Colorado from the Upper Gila region.

Kivas or circular ceremonial chambers associated with house A were of two varieties. One type was the stone form incorporated in the block of the building, the other a subterranean earth chamber placed in a detached position in front of the structure. Two of the kivas in the dwelling were characterized by benches, ventilator recesses, subfloor ventilators, fire pits, deflectors, Katsina niches, and subfloor vaults at the west side of the chamber. The sipapu, or symbolical representation of the mythical place of emergence, was present in only one of these two kivas. This difference is one which has been noted at two other sites in the Zuñi region and undoubtedly had some definite significance. The presence or lack of a sipapu is explained, on the basis of Hopi traditions, by the belief that originally there were two kinds of kivas: One, containing a sipapu, devoted wholly to the purposes of a ceremonial chamber; the other, without such a feature, not especially consecrated and intended for more general uses. The absence of pilasters for roof supports and the occurrence of subfloor vaults in the small ceremonial chambers also seems to be characteristic of the district. The third stone kiva was a simple form of chamber remodeled from two secular rooms and was lacking in many features. It had no bench, no sipapu, no subfloor vault, and no Katsina niche. It probably was built to replace one of the other chambers which had been endangered by the landslide which caused the abandonment of a portion of the building.

The dirt kivas in front of house A were not elaborate. They were roughly D-shaped rather than circular or oval in outline. They had

merely been dug in the ground and had their native earth walls covered with plaster. They had intrawall ventilators, instead of the subfloor variety, deflectors, fire pits, sipapus, and Katsina niches, but none of the other floor features present in the stone chambers. Three of them had recesses above the ventilator. The one which did not differed from the others in that it also had paintings, geometric designs, on its walls. Evidence indicated that these structures belonged to the later portions of the building. In one or two of the chambers there was a suggestion of the prototype of the rectangular kiva which replaced the circular form in some districts in late prehistoric times. Both stone and dirt kivas suggested a northern derivation, although they were characterized by some features peculiarly local.

Two rectangular rooms in house A contained features generally found in kivas, and for that reason it was suggested that they possibly were the prototype of the fraternity chamber, not the rectangular kiva, as contrasted with the true ceremonial room. This difference is exemplified at Zuñi, where the various fraternities have their headquarters in ordinary living rooms. There they meet for the observance of rites pertaining solely to the society. Rituals which concern the entire community, however, are performed in the kivas. A similar feature was present to some extent among the Hopi. Hence it is thought that the two rooms with kiva features may indicate a trend toward the custom among the prehistoric people.

House B, the smaller of the two main dwellings, contained 20 rooms. It did not give evidence of as distinct stages of growth as house A did, but nevertheless showed that a fairly small dwelling had been enlarged from time to time to meet an increasing demand for new chambers. The walls were built of cubical blocks of stone, but in contrast to the masonry in the wings of house A the material was more carefully worked. There were 18 open doorways and 1 which had been sealed in this structure, while there were only 7 in house A. Five of these were in the later sections, and both of those in the older part had been blocked early in its development. This presence and lack of doorways is thought to be another indication that the village was formed through the fusion of two groups of people. The original settlers migrating from the north came from a region where outside pressure had fostered the practice of building fortresslike structures with unbroken walls. In erecting their new dwellings they adhered to the custom of no exterior openings on the ground level, even though there may have been no need for continuing the practice in this district. The later arrivals, however, possibly migrated from their southern homelands before they had been subjected to pronounced depredations and had been forced to do away with the plan of providing numerous doorways. Consequently,

in keeping with their habits they left a fairly large number of openings in the walls of their structures.

There were no circular ceremonial chambers in house B, nor were any present in the earth outside of the building. It is difficult to explain why one section of a community should have built kivas while another did not. One reason advanced was that the occupants of house B may have joined those in house A in the performance of their rites and thus escaped the necessity of providing chambers of their own. Such a plan would not be in accord with general ideas of Pueblo custom, and it was pointed out that some other reason may have been responsible; as, for example, the builders of house B having come from the south, where present knowledge indicates that it was not a prominent feature, were not devotees of the circular kiva. A rectangular inclosure of the fraternity-room type like the two described for house A may have fulfilled all their needs. This seems especially plausible since there was one such chamber in the structure. This question will be referred to again in a subsequent paragraph, however, when the relationship existing between the structures is discussed.

The presence of two great kivas at one location in the Zuñi district is significant. They demonstrate that the superceremonial chamber had a wider distribution than had been suspected and add materially to the evidence for a strong northern element in the village. Only one of these structures, that attached to house A, was completely excavated. Walls of the second one were traced so that its size could be determined, but no other work was done on it. Great kiva No. 1 contained all of the essential features of such a structure. It had a double bench, masonry-support pillars for the superstructure, a north alcove or altar room, a fire pit, and two sub-floor vaults. There were no true peripheral chambers around the structure of the type found in other localities, but there were a few bordering rooms. Great kiva No. 1 measured 51 feet (15.545 m.) in diameter above the large bench, which makes it somewhat larger than the example in the ruin at Aztec, N. Mex. Great kiva No. 2 was much larger, with its diameter of 78 feet (23.774 m.). As a matter of fact, it surpasses in size any of the known structures of the type.

The presence of two of the superceremonial structures in a community of this size is unusual and might be considered an indication that the religious side of its life was overemphasized. The two may not have been contemporaneous. There was clear evidence that great kiva No. 1 had been destroyed by fire, and it is quite possible that the second one was built to replace it. This can not be stated definitely, because great kiva No. 2 was not excavated. If the structures were in existence at the same time two explanations for their presence can be given. One is that this was the ceremonial center

for the entire district and that people from all the surrounding small villages gathered here for the observance of major ritualistic performances. The other reason for two such structures is that the village may have been divided into two large groups, as is the case among some of the modern pueblos, and each had its own great ceremonial house. These large structures are thought to have been the places where the most important of the religious festivals pertaining to the whole village were held. In this connection it was suggested that the present-day inclosed dance courts of some of the modern pueblos may represent a degenerate survival.

The question of the relationship between houses A and B is one which is of interest to the student of the growth of Pueblo villages. The evidence secured during the course of the investigations indicated that the groups coming to the site after the northern people had become established probably built rather hastily to provide themselves with suitable quarters. They chose locations at each end of the existing pueblo, possibly because they were thought to be the most advantageous. After an appreciable length of time had elapsed their numbers had no doubt grown, both as a result of natural increase and the arrival of new increments, until the small rooms abutting house A no longer were sufficient to house them. Consequently, further buildings, detached and somewhat removed from the original dwelling, were provided. In erecting them the construction work was more carefully done, so that the walls of house B are of better quality than those in the wing portions of A, an indication of an improvement in the technique of building. Although a few of the old rooms in the wings of house A were abandoned, most of them continued to be occupied, which argues for a still further increase in the size of the village.

From a general point of view the narration of events would seem more logical had the story been the reverse of that outlined in the preceding paragraph. It would be more in keeping with the idea of how cultures develop had the newcomers first built their own houses apart from the original dwellings; then, eventually, through the processes of amalgamation, merged with the other group to the extent that they built additions to its domicile and abandoned their own, forming as a result a compact, homogeneous community, but one in which there was a certain degeneration in material culture, especially the houses. One of the main factors against such a supposition is that of the pottery types. House B and the other small structure had a higher percentage of red and polychrome wares than did house A and the abandoned rooms in its adjoining wings. Since these pottery forms were shown by the refuse deposits around the site, as well as by independent studies in the region,⁷⁵ to be a

⁷⁵ Spier, L., 1917.

later development than the black-on-white there seems little question but what the structures containing them were subsequent to those which did not. The erection of new chambers in detached locations need not be attributed to a rift in the harmony of the community. More practical reasons were probably responsible for the choice. There was no more suitable space adjoining house A where rooms could be built, and the logical thing to do was to begin a structure at another place.

Reverting to the problem of a lack of kivas in house B and bearing in mind the probable order of development in the village as outlined in a preceding paragraph, the most plausible explanation for the absence of circular ceremonial chambers in the small dwelling seems to be as follows: The earlier group from the south which joined the community, building the east and west wings of house A, probably through association or coalescence with the original settlers adopted the idea of circular chambers and provided such structures by placing the kivas in the earth in front of the east wing. Then when the size of their group increased and it was necessary to build an additional structure they did not construct accompanying ceremonial rooms but continued to use those already in existence.

This explanation is somewhat contradictory to the idea expressed in the discussion of the small house, but there is no other apparent reason for conditions as they were found unless perchance the builders of house B constituted still another group coming into the region from the south. They may not have been associated with the kiva-building people long enough to have adopted the feature before the village was abandoned. If the growth of the community had taken place along other lines, as suggested in another paragraph, and the occupants of house B had erected the two wings at the ends of house A and moved into them the explanation of the kiva problem would be simple. It would be a clear case of an incoming people living alongside another group for a time, then joining and mixing with it and taking over some of its cultural features. Since such does not seem to have been the case, the kiva problem must remain in the more or less confused state described above. In passing, it should be made clear that while the new arrivals in the village constructed and occupied houses or portions of dwellings distinct from the structures already in existence, it is not thought that the different groups lived side by side, maintaining strictly their own ideas and culture, but rather that the community merged into a single large assemblage of people, although it was one in which clan lines were distinctly drawn as in the case of the modern pueblos. There no doubt was intermarriage, an exchange of ideas, and a certain amount of borrowing from both sides, so that, while the

various phases of village activity show clearly their derivation, they nevertheless tended to blend into a characteristic local complex.

The site upon which the Village of the Great Kivas was located was well chosen. It is considerably higher than most of the surrounding terrain, excepting, of course, the cliffs at the north and east sides which provided protection against the chill winter winds from those directions. All surface water from rain and melting snow would rapidly drain away from the buildings and courtyards, and the immediate environs of the village would always be dry underfoot. Furthermore, there was plenty of available crop land adjacent to the houses. Both Red Paint and Lonesome Canyons, at the mouths of which the village was placed, have broad, flat bottoms in which the planting could be done. In addition, there is an even larger expanse extending across Nutria Valley from the tributary canyons. Not only is this land well suited for the growing of beans, corn, and squash, but it is so situated that drainage water from both side canyons spreads out in a thin sheet over it and would provide sufficient moisture for growing plants. In this connection attention was called to the fact that most of the Zuñi villages, prehistoric as well as modern, were placed where full advantage could be taken of the overflow water from the higher ground. Consequently this site was typical in that respect.

The lesser objects of the material culture of this community present only a one-sided picture of the arts and industries of the people, because, with very few exceptions, the only objects which have survived since the days when the community flourished are those fashioned from imperishable materials. The collection of specimens from the site consists in the main of pottery vessels, stone and bone implements, ornaments made from the same materials, fetish heads carved from stone, and stone objects employed as tools without alteration of the original form. The few fragments of articles which were fashioned from perishable material consist of some bits of charred basketry and scraps of cloth.

A large percentage of the pottery comprises forms typical of one single period in southwestern archeology, Pueblo III, although a few sporadic specimens suggest the preceding stage. The vessels as a group are classified under two headings, the culinary and nonculinary wares. The culinary jars are in most cases characterized by indented corrugations covering the entire exterior surface. A few examples have the corrugations only on the neck portion, a Pueblo II feature. The shapes in the cooking jars consist largely of wide-mouthed globular-bodied containers, although a few handled vessels belonging to the pitcher class are found in the group.

The nonculinary vessels are characterized by smooth surfaces and some form of painted decoration. The group includes black-on-

white wares, red vessels with an ornamentation in black, red containers with designs in black and white pigment, buff or cream-colored bowls and jars with the decoration painted in red bordered by black, yellow or buff bowls with red interiors bearing designs in black and exteriors embellished with red, and red bowls with polished or burnished black interiors. Shapes in this group include short-necked, globular-bodied water and storage jars, globular canteens, seed jars, jars with stirrup handles, pitchers, ladles or dippers, bowls, and mugs.

The decorations were placed on the exteriors of the large jars, seed jars, pitchers, canteens, and mugs, and on the interior of bowls and ladles. Exterior ornamentation is rare in the case of the black-on-white bowls but is common on the red and polychrome bowls. The designs and elements from which they were composed were used indiscriminately on all forms of nonculinary pottery, and except for the exterior decorations in the colored-ware group, which are readily identifiable, it is practically impossible to tell from a pattern itself whether it was taken from a black-on-white or colored vessel. The main elements used in the designs are solid and hachured figures. In some instances solid symbols were exclusively used, while others bear only hachured patterns. A third group of decorations comprises those in which there are combinations of the two placed in contrasting and balanced order. The designs on the black-on-white wares show patterns typical of the Upper Gila, of the Chaco Canyon, some Little Colorado forms, Proto-Mesa Verde, and a mixture of Chaco and Upper Gila types of decoration. The latter probably represent a development growing out of the fusion of two ceramic styles in this community. The Little Colorado and Proto-Mesa Verde examples present appear to be actual trade pieces rather than vessels locally made but influenced by the ceramics of those districts.

Most of the red vessels with black decoration are typical of the class found throughout the region from western New Mexico into Arizona along the Puerco of the West, the Zuñi, and Little Colorado Rivers. Similar examples have been found in the Chaco Canyon, at Aztec, and other northern centers. A few bear patterns which are more characteristic of the Upper Gila and the eastern part of the Little Colorado district proper. The red vessels with black interior designs and exterior decoration in white are typical of the Little Colorado bowls, which were the most extensively distributed of the types from that culture and which are considered typical of the ceramics of the region between St. Johns and Holbrook.

The polychrome bowls with red interiors ornamented with black designs and orange-colored exteriors with decorations in red are of the type which is known as Houck ware. The interior decorations in

this group are quite similar to the black-on-red patterns in general, which would indicate that it was a local specialization of a widespread form, the chief distinguishing feature of the ware being that of the exterior surface. The polychrome vessels with black-on-red interiors and red-on-white exteriors are very suggestive of the more highly developed St. Johns-Holbrook form of the Little Colorado wares. The distinction between the containers of this class and those of the Houck variety lies in the exterior treatment. The Houck group owes its exterior color to the unslipped surface of the paste, while the St. Johns-Holbrook type has a light-colored slip applied around the outside. The latter group suggests that it might have been a prototype for the pottery which later developed into the early Gila Basin polychrome. Red pottery with burnished or polished black interiors is represented by only a few specimens, and they seem to have been importations and not locally made. The type of ware is very common in the sections to the west and may well have been carried to this village.

Basketry is represented in the collection of specimens by only a few charred fragments and it is not possible to give a detailed discussion of the variety of such objects made by the occupants of the village. There are two forms of technique apparent in the pieces recovered from the ruins. One is the coiling method of basket making which was widespread throughout the Southwest. The coiling in this case consisted of two rods and a bundle, the rods being placed side by side and surmounted by the bundle. The second type is that of the twilled or diagonal checker weave. This is only occasionally found in prehistoric ruins, but it is employed now and then by the modern weavers.

The bone implements recovered from the site include a large variety of awls, scrapers, punches, beads, bone tubes, turkey calls, and ornaments. Animal bones used for tools were from the mule deer, antelope, jack rabbit, lynx, wolf, fox, and dog. The only bird bones used were from the turkey. In general it may be said that the implements are quite like those usually found in ruins in the more northern parts of the Pueblo area. Certain of the large scrapers or fleshers are of the type characteristic of Pueblo Bonito in the Chaco Canyon, Aztec, and the Mesa Verde. In fact they represent a form of implement which is called the San Juan flesher. The presence of these tools correlates with the other northern features and indicates that the Chaco element in the community brought many parts of the culure complex into the district with them.

Objects of stone include milling stones or metates, mortars, mauls, jar stoppers, arrow-shaft smoothers, ax heads, small mortars and pestles for grinding paint, arrowheads, spear points, ornaments, effigy heads, and pebbles and stones which were employed in their natural

state. The materials used in making these objects were sandstone, diorite, lava, amphibolite, chalcedony, jasper, granite, and slate. Part of the objects were made by the pecking and grinding method, the rest by the flaking and chipping. The metates or milling stones are of two types, the open-end, grooved or trough form, and a flat-surfaced stone slightly concave from end to end. It was found in the investigations that the trough type was the oldest and that it was replaced by the flat form at about the time when alterations in the original portion of the village were being brought to completion. The trough metate is essentially a northern form, while the flat type is southern and western and may have been introduced into this section by the group which joined the village after it had become well established.

Two types of mauls are represented in the collection. The predominant form is a short cylindrical one with flat striking surfaces and a hafting groove completely encircling it. The second is a flat tabular-shaped stone with rounded or blunt-pointed ends. On some of this group the groove completely encircles the object, while on others it is present only on three sides. The three-quarters style of groove is more commonly found in the south and west than in the north. Ax heads are grooved and have comparatively short cutting edges. Some were made from oval-shaped boulders and others from flat stones. The oval-boulder forms have rounded bases and the tabular-shaped heads have flat ones. The hafting grooves are of the two forms described for the mauls, but the complete groove is present on a majority of the specimens. The ax heads from the Little Colorado region are characterized to a marked degree by their short cutting edges, and while no typical examples of that style of bit were found at this site the axes indicate a tendency in that direction.

The chief significance in the sandstone jar stoppers and arrow-shaft polishers is that they are objects more commonly found in the Upper Gila and Little Colorado areas than in the northern parts of the Pueblo region. Consequently they may be considered a southern contribution to the material culture of the community. This is also true to a certain extent in the case of the paint mortars. An occasional example of the latter is found in the ruins to the north, but they occur in large numbers only in the southern sections. On the other hand, the rounded conical objects designated corn goddess symbols may have been introduced from the north, although they are not by any means unknown in Little Colorado ruins.

Spear heads, knife blades, and arrow points are not numerous in the collection. Why there should have been so few specimens of this kind is not known, but there probably is some significance in

their absence, since other ruins in the same general region have shown a similar condition. The arrowheads are all of the same type. They have a broad squared tang and the notches for hafting are at right angles to the long line of the blade. The chipping does not show any special degree of excellence.

Ornaments made from stone were scarce. The collection of specimens from the site contains only a few beads, pendants, and fragments from inlays. The beads are all of the disk form and were made from a soft white stone known as southwestern alabaster. Pendants are round or oval shaped disks with a perforation at one side. Some were made from the same material as the beads, while others are a ferruginous shale. Turquoise seems not to have been used, since only a few small unworked fragments were found.

The effigy heads carved from blocks of sandstone show that some of the inhabitants of the village possessed a fairly high degree of artistic talent. It is not possible in all cases to tell what the objects were intended to represent, but this may be due to the fact that they depict mythological as well as actual creatures. What their exact function may have been is not known. The suggestion was made that they had served as fetishes in ceremonies or that they may have been clan symbols. Indications were that the heads were intended for use on bodies made from perishable materials. Besides sculpturing, the people engraved symbols and figures on the faces of the cliffs back of the village. The latter occur in groups and as single petroglyphs and include both geometric and life forms. Some of the rock drawings are unquestionably late and probably represent the work of the historic Zuñi and Navajo. Among the unquestionably ancient figures are two of the humpbacked flute players which are found in widely scattered regions in the Southwest. Considering the petroglyphs as a group, there is nothing about them which can definitely be attributed to people from any one particular region. Similar carvings can be found in practically all sections of the Pueblo area.

Sixty burials were uncovered during the investigations at the site. Most of the interments had been made in refuse mounds located at various points in the village. A few, however, were found in the earth outside the bounds of such deposits. Several infants had been placed close to outdoor fire pits, and one individual was buried in an abandoned pit oven. Twenty-four of the graves contained infants and young children. Of the 36 adult skeletons 12 were males, 16 were females, and 8 could not be sexed. Because of the rather high mortality rate among infants in the modern pueblos the percentage found at this site probably does not represent the true relation between the child and adult groups. Infant remains no doubt disintegrate more rapidly than do those of older

people, and for that reason many such interments probably could not be found. The customary position for the body was the flexed or contracted. There was some attempt at orientation, as 46 out of the 60 burials had the head placed in an easterly direction. In 2 cases it was to the south, 2 others had it to the west, and in 10 instances it was not possible to determine the body direction. Most of the graves contained mortuary offerings consisting of pottery vessels placed near the head or upper part of the body. Just two examples were found where the funerary objects were at the feet. These two were the burials with the head to the west, and for that reason it is thought that the body bundles were reversed on the way to the grave and the pottery placed at the feet with the idea that it was near the head. Seven of the interments had no offerings of any kind. The skeletal material was in such poor condition that a careful study of the physical characteristics of the people was not feasible. Two things were outstanding, however. One was the pronounced occipital flattening of the crania and the other a large percentage of decayed teeth. The latter probably was due to a deficiency in diet. On the basis of occupied rooms and the number of burials found it is estimated that the village probably had a population of about 100 individuals and that it was occupied over a period of from 15 to 20 years. This conclusion is based on the postulation that there were 20 families averaging 5 each and that the annual death rate was approximately 3.

The date of the village according to present-day chronology was obtained through charred beams salvaged from various parts of the ruin. From this material Dr. A. E. Douglass was able to give the date 1015, plus or minus 15, for the cutting of the timbers. Consequently it may be said that the village was built and occupied during the interval between the years 1000 and 1030 A. D. It was during this same period that considerable building activity was under way in the Chaco Canyon in the north, and evidence suggests that there was some correlation between the two, that both belonged to the expansion age of the early eleventh century. There is no doubt but what the Village of the Great Kivas was inhabited in the days when the Pueblo cultures were forging toward the peak of their classic era and that it was built by groups migrating from two different regions.

APPENDIX

TABLE 1.—MEASUREMENTS IN HOUSE A

[Taken through center of rooms]

Room No.	East-west		North-south		Room No.	East-west		North-south	
	<i>Ft. in.</i>	<i>Meters</i>	<i>Ft. in.</i>	<i>Meters</i>		<i>Ft. in.</i>	<i>Meters</i>	<i>Ft. in.</i>	<i>Meters</i>
1.....	7 6	2.286	8 4	2.540	33.....	9 8	2.946	10 5	3.175
2.....	7 5	2.261	5 6	1.676	34.....	19 2	5.842	6 6	1.981
3.....	6 10	2.083	7 4	2.235	35.....	11 5	3.480	11 0	3.353
4.....	7 2	2.184	5 6	1.676	36.....	2 11	.889	6 6	1.981
5.....	6 4	1.930	6 0	1.829	37.....	2 7	.787	4 5	1.346
6.....	13 4	4.064	5 6	1.676	38.....	2 5	.737	4 4	1.321
7.....	6 10	2.083	5 0	1.524	39.....	5 0	1.524	2 5	.737
8.....	7 4	2.235	5 2	1.575	40.....	4 3	1.295	10 6	3.200
9.....	9 6	2.896	6 0	1.829	41.....	3 10	1.168	10 7	3.226
10.....	10 0	3.048	8 6	2.591	42.....	20 5	6.223	9 2	2.794
11.....	6 2	1.880	6 4	1.930	43.....	4 3	1.295	11 2	3.404
12.....	10 6	3.200	8 1	2.464	44.....	4 2	1.270	10 2	3.099
13.....	12 8	3.861	8 0	2.438	45.....	8 10	2.692	3 5	1.041
14.....	7 4	2.235	6 0	1.829	46.....	5 2	1.575	2 11	.889
15.....	5 4	1.626	6 0	1.829	47.....	14 6	4.420	9 0	2.743
16.....	6 5	1.956	4 5	1.346	48.....	9 3	2.819	5 0	1.524
17.....	6 2	1.880	5 0	1.524	49.....	9 3	2.819	6 3	1.905
18.....	7 7	2.311	15 9	4.801	50.....	9 5	2.870	9 0	2.743
19.....	7 11	2.413	4 5	1.346	51.....	4 2	1.270	4 0	1.219
20.....	9 0	2.743	7 7	2.311	52.....	6 10	2.083	5 8	1.727
21.....	9 4	2.845	5 3	1.600	53.....	6 2	1.880	6 3	1.905
22.....	7 10	2.388	10 2	3.099	54.....	6 4	1.930	6 0	1.829
23.....	5 9	1.753	8 0	2.438	55.....	4 4	1.321	6 2	1.880
24.....	5 8	1.727	5 9	1.753	56.....	6 8	2.032	8 5	2.565
25.....	5 7	1.702	7 5	2.261	57.....	7 5	2.261	7 0	2.134
26.....	7 5	2.261	10 3	3.124	58.....	7 5	2.261	8 0	2.438
27.....	8 0	2.438	7 5	2.261	59.....	6 8	2.032	4 11	1.499
28.....	7 0	2.134	5 6	1.676	60.....	6 10	2.083	10 4	3.150
29.....	6 4	1.930	7 7	2.311	28-A.....	17 10	5.436	8 10	2.692
30.....	6 7	2.007	8 2	2.439	31-A.....	14 10	4.521	10 10	3.302
31.....	15 4	4.674	10 3	3.124	32-A.....	6 6	1.981	10 2	3.099
32.....	5 2	1.575	10 5	3.175	33-A.....	7 0	2.134	10 4	3.150

¹ To end of wall.

TABLE 2.—MEASUREMENTS IN HOUSE B

[Taken through center of rooms]

Room No.	East-west		North-south		Room No.	East-west		North-south	
	<i>Ft. in.</i>	<i>Meters</i>	<i>Ft. in.</i>	<i>Meters</i>		<i>Ft. in.</i>	<i>Meters</i>	<i>Ft. in.</i>	<i>Meters</i>
1.....	9 5	2.870	9 8	2.946	11.....	4 7	1.397	20 0	6.096
2.....	12 2	3.708	9 0	2.743	12.....	9 10	2.997	7 4	2.235
3.....	4 10	1.473	5 4	1.626	13.....	6 2	1.879	8 10	2.692
4.....	5 8	1.727	13 9	4.191	14.....	13 9	4.191	8 9	2.667
5.....	12 4	3.759	6 7	2.007	15.....	12 3	3.734	8 7	2.616
6.....	5 4	1.626	5 6	1.676	16.....	6 4	1.930	7 8	2.337
7.....	3 3	.991	34 6	10.515	17.....	7 4	2.235	7 7	2.311
8.....	5 11	1.803	9 8	2.946	18.....	12 0	3.658	8 8	2.642
9.....	5 11	1.803	15 0	4.572	19.....	6 11	2.108	8 11	2.718
10.....	6 4	1.930	15 7	4.750	20.....	8 0	2.438	10 3	3.124

TABLE 3.—SIZE AND PROVENIENCE OF OBJECTS ILLUSTRATED IN PLATES

Plate	Diameter		Height		Provenience	Field No.	National Museum No.
	Inches	Centi-meters	Inches	Centi-meters			
21, a	13½	34.290	14½	35.719	House A, room 10	130A	351779
22, a	12¼	31.115	10½	26.828	House B, room 4	375	351994
b	12¾	31.432	12	30.480	do	376	351995
c	5½	14.922	5½	14.128	Burial 20	50	351701
d	6¼	15.875	6¼	15.557	Burial 39	88	351740
e	5½	14.287	5½	14.128	Burial 2	7	351659
f	7	17.780	6½	16.510	Burial 6	21	351671
23, a	3¾	9.208	4¾	11.748	Burial A-2	282	351905
b	4¾	10.954	4½	11.430	Burial A-7	26	351676
c	4¾	11.113	4¾	11.748	Burial 38	87	351739
d	3¾	9.049	4¾	11.271	A refuse	292	351915
e	4¾	10.478	4¾	10.954	Burial 37	85	351737
24, a	4½	11.430	3¾	8.573	House B, room 4	366	351985
b	4¾	12.224	3¾	9.208	Burial B-9	310	351932
c	13	33.020	10¾	27.305	House B, room 4	334	351957
25, a	4¾	11.748	3¾	7.938	Burial B-4	302	351924
b	7¾	19.685	5¾	14.129	Burial 2	3	351654
26, a	2½	6.668	2¾	6.509	Burial 30	69	351720
b	2¼	7.461	2¾	6.033	House A, room 11	132	351781
c	2¾	6.509	2½	6.668	Burial 35	82	351734
d	3¼	8.255	2½	7.461	Burial 34	76	351728
e	3¾	8.096	3¼	8.255	Burial B-5	303	351925
f	3¾	8.096	3¼	7.779	Burial A-5	290	351913
27, a	8¼	20.955	3¾	8.731	Burial 25	61	351712
b	8	20.320	3¾	9.208	House B, room 4	364	351983
c	7¾	18.256	6¾	15.716	Burial 25	60	351711
d	6¾	15.558	6¾	17.304	Burial 32	74	351726
e	6¾	17.463	7¾	18.098	Burial B-3	299	351921
28, a	6¼	15.875	6¾	17.145	Burial 5	16	351668
b	5¼	14.446	6½	16.510	Burial A-3	283	351906
c	5¾	13.176	5¾	14.763	Burial B-10	313	351935
d	6½	16.510	5¾	15.081	Burial 16	47	351698
e	5¾	13.811	5¾	14.605	Burial 1	2	351652
f	6¾	16.827	7¼	18.415	Burial B-1	296	351917

Plate	Length		Length of bowl		Width of bowl		Provenience	Field No.	National Museum No.
	Inches	Centi-meters	Inches	Centi-meters	Inches	Centi-meters			
29, a	6¾	15.716	3¾	8.731	3¾	7.779	A refuse	94	351746
b	4¾	11.271	2¾	6.668	2¼	5.715	Below R. 31, house A	148	351795
c	3¾	9.684	2¼	6.826	1¾	4.604	House A, room 22	134	351783
30, a	7¼	18.415	4¼	10.795	3¾	7.779	Burial B-3	301	351923
b	9¼	23.495	4¾	12.541	4¼	10.795	Burial 6	22	351672
c	9¾	24.448	4¾	12.541	4¾	10.636	House B, room 4	372	351991

TABLE 3.—SIZE AND PROVENIENCE OF OBJECTS ILLUSTRATED IN PLATES—Continued

Plate	Diameter		Height		Provenience	Field No.	National Museum No.
	Inches	Centimeters	Inches	Centimeters			
31, a	11 $\frac{1}{4}$ $\frac{1}{16}$	28.099	4 $\frac{3}{4}$	12.065	Burial 16	46	351697
b	11 $\frac{3}{4}$ $\frac{1}{16}$	30.004	5 $\frac{1}{4}$	13.335	House B, room 4	374	351993
c	12 $\frac{3}{8}$	31.432	6 $\frac{3}{4}$ $\frac{1}{16}$	15.716	Burial B-11	316	351938
32, a	6 $\frac{1}{4}$ $\frac{1}{16}$	15.399	2 $\frac{1}{2}$	6.350	Burial 2	6	351658
b	6 $\frac{1}{2}$	16.510	2 $\frac{3}{4}$	6.985	Burial 6	24	351674
c	6 $\frac{3}{8}$	16.193	3 $\frac{3}{4}$ $\frac{1}{16}$	8.414	Burial 36	83	351735
d	6 $\frac{1}{4}$	15.875	2 $\frac{3}{4}$	6.985	Burial 19	49	351700
e	6 $\frac{7}{8}$ $\frac{1}{16}$	16.351	2 $\frac{7}{8}$	7.303	Burial A-5	289	351912
f	6 $\frac{1}{4}$ $\frac{1}{16}$	15.399	1 $\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{16}$	4.921	Burial 38	86	351738
33, a	8 $\frac{1}{2}$	21.590	4 $\frac{1}{4}$	10.795	Burial 11	40	351690
b	8 $\frac{9}{16}$	21.749	3 $\frac{3}{4}$ $\frac{1}{16}$	9.049	Burial 2	9	351661
c	8 $\frac{3}{4}$ $\frac{1}{16}$	20.479	4 $\frac{1}{8}$	10.478	Burial 1	1	351651
d	8 $\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{16}$	22.066	4 $\frac{3}{8}$	11.113	Burial 32	72	351724
e	7 $\frac{3}{4}$ $\frac{1}{16}$	18.574	3 $\frac{3}{8}$	8.573	Burial A-4	287	351910
f	7 $\frac{9}{16}$	19.209	3 $\frac{1}{2}$	8.890	Burial 11	38	351688
Plate	Length of bowl		Width of bowl		Provenience	Field No.	National Museum No.
	Inches	Centimeters	Inches	Centimeters			
34, a	5 $\frac{1}{8}$	13.018	4 $\frac{1}{4}$	10.795	Burial B-6	306	351928
b	5 $\frac{1}{2}$	13.970	4 $\frac{9}{16}$	11.589	Burial 7	25	351675
c	5 $\frac{1}{2}$ $\frac{1}{16}$	15.081	4 $\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{16}$	12.224	A refuse	92	351744
d	5 $\frac{7}{8}$ $\frac{1}{16}$	13.811	4 $\frac{1}{2}$	11.430	Burial 37	84	351736
e	4 $\frac{3}{8}$	11.113	3 $\frac{3}{4}$	9.525	Kiva 2	116	351768
f	5	12.700	4	10.160	A refuse	91	351743
35, a	7 $\frac{3}{4}$ $\frac{1}{16}$	18.256	3 $\frac{3}{8}$	8.573	Burial A-1	280	351903
b	8 $\frac{1}{4}$ $\frac{1}{16}$	20.479	3 $\frac{1}{2}$	8.890	Burial B-11	317	351939
c	7 $\frac{3}{8}$	18.733	3 $\frac{3}{4}$	9.525	Burial 31	71	351722
d	7 $\frac{3}{8}$	18.733	3 $\frac{3}{4}$ $\frac{1}{16}$	8.414	Burial 32	73	351725
e	8	20.320	3 $\frac{3}{8}$	9.208	House B, room 4	364	351983
f	6 $\frac{3}{4}$	17.145	3 $\frac{1}{4}$ $\frac{1}{16}$	7.779	Burial 29	67	351718
36, a	8 $\frac{3}{4}$	22.225	4 $\frac{1}{4}$	10.795	Burial A-3	284	351907
b	8 $\frac{1}{4}$	20.955	3 $\frac{7}{16}$	8.731	Burial 25	61	351712
c	9 $\frac{1}{8}$	23.178	4 $\frac{1}{4}$ $\frac{1}{16}$	10.319	Burial B-3	300	351922
d	9 $\frac{7}{8}$	25.083	5 $\frac{1}{4}$ $\frac{1}{16}$	12.859	Burial B-1	297	351913
e	8 $\frac{9}{16}$	21.114	3 $\frac{7}{8}$	9.843	Burial B-10	314	351936
f	8 $\frac{3}{4}$	22.225	3 $\frac{3}{4}$	9.525	Burial 9	34	351684
37, a	11 $\frac{1}{4}$ $\frac{1}{16}$	28.099	4 $\frac{3}{4}$	12.065	Burial 16	46	351697
b	11 $\frac{3}{4}$ $\frac{1}{16}$	30.004	5 $\frac{1}{4}$	13.335	House B, room 4	374	351993
38, a	12 $\frac{3}{8}$	31.433	4 $\frac{3}{8}$	12.383	do	373	351992
b	12 $\frac{3}{8}$	31.433	6 $\frac{3}{4}$ $\frac{1}{16}$	15.716	Burial B-11	316	351938
39, a	4 $\frac{1}{4}$ $\frac{1}{16}$	10.319	$\frac{3}{8}$	.953	House A, room 33	158E	351805
b	3 $\frac{9}{16}$	9.049	$\frac{3}{8}$	.953	House B, room 15	359B	351977
c	2 $\frac{7}{8}$	7.303	$\frac{3}{8}$	.953	Kiva 2	120D	351771
d	3 $\frac{1}{8}$	9.049	$\frac{3}{4}$ $\frac{1}{16}$	.794	House A, room 33	158F	351805
e	3 $\frac{1}{2}$	8.890	$\frac{3}{4}$	.635	House B, room 15	359C	351977
f	3 $\frac{1}{4}$ $\frac{1}{16}$	9.366	$\frac{7}{16}$	1.111	House B, room 10	347D	351970
g	3 $\frac{3}{4}$ $\frac{1}{16}$	8.414	$\frac{9}{16}$	1.429	House A, room 34	196B	351833
h	3 $\frac{1}{4}$ $\frac{1}{16}$	9.366	$\frac{5}{8}$	1.588	House A, room 28	236B	351869
i	4 $\frac{7}{8}$ $\frac{1}{16}$	11.271	$\frac{7}{16}$	1.111	House B, room 13	353A	351973
j	4 $\frac{1}{4}$ $\frac{1}{16}$	10.319	$\frac{1}{2}$	1.270	House B, room 15	359A	351977
k	3 $\frac{9}{16}$	9.049	$\frac{9}{16}$	1.429	House A, room 27	213D	351846

TABLE 3.—SIZE AND PROVENIENCE OF OBJECTS ILLUSTRATED IN PLATES—Continued

Plate	Length		Diameter		Provenience	Field No.	National Museum No.
	Inches	Centi-meters	Inches	Centi-meters			
40, a	5 $\frac{7}{8}$	14.923	$\frac{5}{16}$	0.794	House A, room 27	213A	351846
b	4 $\frac{5}{16}$	10.954	$\frac{3}{16}$	.476	Kiva B	248A	351880
c	4 $\frac{3}{4}$	12.065	$\frac{3}{16}$	.476	House A, room 22	141C	351789
d	4 $1\frac{3}{16}$	12.224	$\frac{1}{4}$	.635	do	141E	351789
e	4 $\frac{7}{16}$	11.271	$\frac{5}{16}$	.794	House A, room 44	170A	351813
f	4 $\frac{1}{8}$	10.478	$\frac{1}{2}$	1.270	B refuse	322A	351945
g	1 $\frac{7}{8}$	4.763	$\frac{3}{8}$	.953	House A, room 33	158J	351805
h	3	7.620	$\frac{3}{8}$	.953	do	158H	351805
i	3 $\frac{1}{16}$	7.779	$\frac{3}{16}$	1.111	Great kiva 1	261A	351895
j	2 $1\frac{5}{16}$	7.461	$\frac{3}{8}$	.953	Kiva 4	115E	351766
k	2 $1\frac{3}{16}$	7.144	$\frac{7}{16}$	1.111	House A, room 3	125	351773
l	2 $\frac{3}{4}$	6.985	$\frac{5}{16}$	.794	Kiva 2	120E	351771
41, a	8 $\frac{3}{8}$	21.908	$\frac{3}{8}$	.953	A refuse	105A	351759
b	7 $\frac{9}{16}$	19.209	$\frac{7}{16}$	1.111	House A, room 57	182B	351822
c	5 $\frac{1}{8}$	13.018	$\frac{7}{16}$	1.111	House A, room 27	213B	351846
d	5 $\frac{1}{16}$	12.859	$\frac{3}{8}$	.953	Kiva A	243B	351877
e	4 $\frac{9}{16}$	11.589	$\frac{7}{16}$	1.111	House B, room 13	354B	351973
f	2 $\frac{9}{16}$	6.509	$\frac{3}{8}$	.953	House B, room 15	358F	351977
g	2 $\frac{9}{16}$	6.509	$\frac{3}{8}$	.953	Kiva 4	115C	351766
h	3	7.620	$\frac{3}{8}$	.953	House A, room 29	238C	351871

Plate	Length		Width through center		Provenience	Field No.	National Museum No.
	Inches	Centi-meters	Inches	Centi-meters			
42, a	8	20.320	$\frac{7}{16}$	1.111	House B, room 2	333A	351956
b	7 $\frac{1}{2}$	17.050	$\frac{7}{16}$	1.111	House A, room 18	230A	351862
c	2 $\frac{7}{8}$	7.303	$\frac{7}{16}$	1.111	Kiva 2	120B	351771
d	3 $\frac{7}{16}$	8.731	$\frac{9}{16}$	1.429	House A, room 18	230E	351862
e	4 $\frac{1}{4}$	10.795	$\frac{9}{16}$	1.429	A refuse	106D	351759
f	4 $\frac{1}{16}$	10.319	$\frac{7}{16}$	1.111	House A, room 34	196A	351833
43, a	7 $\frac{1}{16}$	17.939	$1\frac{1}{32}$	1.191	Kiva 2	119A	351771
b	4 $\frac{7}{8}$	12.383	$\frac{5}{16}$	.794	House A, room 32	152A	351801
c	3 $\frac{1}{8}$	7.938	$\frac{7}{16}$	1.111	A refuse	106F	351759
d	4 $\frac{9}{16}$	11.748	$1\frac{3}{32}$	1.032	Burial 15	45	351696
e	2 $\frac{9}{8}$	6.668	$1\frac{3}{32}$	1.349	Kiva B	248B	351880
f	4 $\frac{3}{8}$	11.113	$\frac{3}{8}$	.953	Refuse B	322B	351945
g	5 $\frac{9}{16}$	14.129	$\frac{9}{16}$	1.429	Kiva C	255A	351886
h	5 $\frac{1}{4}$	13.335	$\frac{5}{16}$	.794	House A, room 33	161A	351805

Plate	Length		Width through head		Provenience	Field No.	National Museum No.
	Inches	Centi-meters	Inches	Centi-meters			
44, a	4 $1\frac{1}{16}$	11.906	1 $\frac{1}{16}$	2.699	House B, room 10	346	351970
b	5 $\frac{7}{16}$	13.811	1 $\frac{1}{8}$	2.858	House B, room 13	352	351973
c	6 $\frac{1}{8}$	16.510	1 $\frac{7}{16}$	3.651	House A, room 14	226	351859
d	7 $\frac{1}{16}$	17.939	1 $\frac{1}{8}$	2.858	Kiva 4	113	351766
e	7 $\frac{1}{2}$	19.050	1 $\frac{1}{4}$	3.175	House A, room 31	146	351794
f	6 $1\frac{1}{16}$	16.986	1 $\frac{3}{16}$	3.016	House B, room 15	357	351977

TABLE 3.—SIZE AND PROVENIENCE OF OBJECTS ILLUSTRATED IN PLATES—Continued

Plate	Length		Width		Provenience	Field No.	National Museum No.
	Inches	Centi-meters	Inches	Centi-meters			
45, a.....	3 $\frac{1}{4}$ ₁₆	8.366	$\frac{3}{4}$ ₁₆	0.476	House A, room 22.....	140B	351789
b.....	$\frac{3}{4}$	8.255	$\frac{3}{4}$ ₁₆	.476	House A, room 33.....	160D	351805
c.....	$\frac{3}{4}$ ₁₆	9.843	$\frac{3}{4}$ ₁₆	.476	House A, room 59.....	188A	351826
d.....	3	7.620	$\frac{3}{4}$	.635	House A, room 33.....	161F	351805
e.....	2 $\frac{3}{4}$	6.033	$\frac{3}{4}$	.635	A refuse.....	107D	351759
f.....	2 $\frac{1}{4}$ ₁₆	6.826	$\frac{3}{4}$	.635	.....do.....	107A	351759
g.....	2 $\frac{1}{4}$ ₁₆	7.461	$\frac{3}{4}$ ₁₆	.476	House A, room 33.....	160F	351805
h.....	$\frac{3}{4}$ ₁₆	8.731	$\frac{3}{4}$ ₁₆	.476	House B, room 13.....	354D	351973
i.....	$\frac{3}{4}$ ₁₆	8.890	$\frac{3}{4}$ ₁₆	.476	House A, room 11.....	133	351782
j.....	$\frac{3}{4}$ ₁₆	9.049	$\frac{3}{4}$	.635	House A, room 33.....	160C	351805
k.....	4 $\frac{3}{4}$ ₁₆	10.636	$\frac{3}{4}$	.635	.....do.....	160A	351805
l.....	$\frac{3}{4}$ ₁₆	9.208	$\frac{3}{4}$	.635	.....do.....	160B	351805

Plate	Length		Width through center		Provenience	Field No.	National Museum No.
	Inches	Centi-meters	Inches	Centi-meters			
46, a.....	6 $\frac{1}{4}$	11.557	$\frac{1}{4}$ ₁₆	2.381	Burial 16.....	48	351699
b.....	6 $\frac{1}{2}$	16.510	1	2.540	House A, room 3.....	124	351772
c.....	6 $\frac{3}{4}$ ₁₆	16.034	$\frac{1}{4}$ ₁₆	2.858	House A, room 27.....	211	351845
47, a.....	2 $\frac{1}{4}$ ₁₆	5.239	$\frac{1}{2}$	1.270	A refuse.....	103C	351757
b.....	2	5.080	$\frac{1}{2}$	1.270	House A, room 22.....	139A	351788
c.....	1 $\frac{1}{4}$ ₁₆	4.604	$\frac{3}{4}$ ₁₆	1.111	.....do.....	139B	351789
d.....	2 $\frac{1}{4}$ ₁₆	6.826	$\frac{3}{4}$	.953	House A, room 14.....	224A	351857
e.....	1 $\frac{1}{4}$	3.175	$\frac{3}{4}$	.953	House B, room 13.....	351A	351972
f.....	1 $\frac{3}{4}$ ₁₆	3.334	$\frac{1}{4}$ ₃₂	1.032	Burial B-9.....	312	351934
g.....	$\frac{7}{8}$	2.223	$\frac{5}{4}$ ₁₆	.794	House A, room 22.....	137	351786
h.....	1 $\frac{1}{2}$	3.810	$\frac{5}{4}$ ₁₆	.794	Kiva 2.....	118A	351770
i.....	3	7.620	$\frac{1}{2}$	1.270	House A, room 50.....	177A	351819

Plate	Length		Width or diam-eter		Provenience	Field No.	National Museum No.
	Inches	Centi-meters	Inches	Centi-meters			
48, a.....	$\frac{3}{4}$ ₁₆	8.573	$\frac{3}{4}$	0.953	House A, room 44.....	174	351816
b.....	$\frac{3}{4}$ ₁₆	8.573	$\frac{1}{4}$	.318	Kiva 4.....	114	351767
c.....	$\frac{3}{4}$ ₁₆	9.208	$\frac{3}{4}$ ₁₆	.476	A refuse.....	104B	351758
d.....	$\frac{3}{4}$ ₁₆	8.890	$\frac{3}{4}$ ₁₆	.476	House A, room 28.....	237	351870
e.....	6 $\frac{1}{2}$	16.510	$\frac{3}{4}$ ₁₆	.476	House A, room 44.....	175	351817
f.....	2 $\frac{3}{4}$ ₃₂	2.302	$\frac{3}{4}$	.953	House A, room 55.....	275	351901
g.....	1 $\frac{5}{4}$ ₁₆	2.381	$\frac{7}{4}$ ₁₆	1.111	.....do.....	275	351901
h.....	$\frac{3}{4}$	1.905	$\frac{3}{4}$	.953	House B, room 15.....	355	351974
i.....	1 $\frac{3}{4}$ ₁₆	2.064	$\frac{7}{4}$ ₁₆	1.111	.....do.....	355	351974
j.....	2 $\frac{5}{4}$ ₃₂	1.984	$\frac{3}{4}$	.953	.....do.....	355	351974
k.....	$\frac{3}{4}$	1.905	$\frac{3}{4}$	.953	.....do.....	355	351974
l.....	$\frac{3}{4}$	1.905	$\frac{5}{4}$ ₁₆	.794	.....do.....	355	351974
m.....	1 $\frac{1}{4}$ ₁₆	4.286	$\frac{7}{4}$	2.223	House B, room 2.....	331	351964

TABLE 3.—SIZE AND PROVENIENCE OF OBJECTS ILLUSTRATED IN PLATES—Continued

Plate	Length		Width		Thickness		Provenience	Field No.	National Museum No.
	Ft. in.	Centi-meters	Ft. in.	Centi-meters	Inches	Centi-meters			
49, a.....	1 8	50.80	1 3½	39.37	3	7.62	House A, room 22.....	-----	-----
b.....	1 9	53.34	1 0	30.48	2½	6.35	do.....	-----	-----
c.....	1 6	45.72	1 5	43.18	1½	3.81	House A, room 49.....	-----	-----
d.....	1 5	43.18	0 11½	29.21	1¼	3.17	House B, room 4.....	-----	-----
50, a.....	1 5	43.18	0 11	27.94	1½	3.81	House A, room 23.....	-----	-----
b.....	1 5½	44.45	1 0	30.48	1½	3.81	House B, room 2.....	-----	-----
c.....	1 7	48.26	1 2	35.56	7	17.78	House A.....	-----	-----
d.....	1 3	38.10	1 2	35.56	6½	16.51	House B, room 3.....	-----	-----

Plate	Length		Width		Thickness		Provenience	Field No.	National Museum No.
	Inches	Centi-meters	Inches	Centi-meters	Inches	Centi-meters			
51, a.....	4½½	12.541	4¾	11.113	2¼	5.715	House B, refuse.....	371	351990
b.....	4	10.160	3¾	9.843	3¾	8.096	House B, room 20.....	362A	351980
c.....	3¾	8.414	3¼	7.938	2¾	7.303	House B, room 4.....	340B	351964
d.....	4¾	10.636	3½	8.890	3	7.620	House B, room 20.....	362C	351980
e.....	4¾	12.383	3	7.620	2¾	6.191	House A, room 27.....	215	351848
f.....	3¾	8.414	3¾	8.731	2¾	6.985	House B, room 10.....	343	351967
52, a.....	3	7.620	2¾	5.874	1¾	3.334	House A, room 44.....	169	351812
b.....	3¾	7.779	2¾	5.874	1¾	3.969	House A, room 22.....	136A	351785
c.....	4	10.160	2¾	6.033	1¾	3.493	House A, room 34.....	206	351841
d.....	3¾	9.525	2¾	6.191	1¾	4.763	do.....	207	351841
e.....	3¾	9.843	2¾	7.303	1¾	3.810	do.....	205	-----
f.....	4¼	10.795	2¾	6.985	1¾	3.493	House A, room 10.....	131	351780

Plate	Top diameter		Bottom diameter		Thickness		Provenience	Field No.	National Museum No.
	Inches	Centi-meters	Inches	Centi-meters	Inches	Centi-meters			
53, a.....	4½	10.319	2¾½	7.144	3¾	8.096	House A, room 34.....	201	351836
b.....	3¾	9.843	2¾½	7.461	2¾	5.556	House A, room 33.....	162	351806

Plate	Length		Width		Thickness		Provenience	Field No.	National Museum No.
	Inches	Centi-meters	Inches	Centi-meters	Inches	Centi-meters			
53, c.....	3¾	9.525	4¼	10.795	1¾½	4.604	House A, room 27.....	216A	351849
d.....	3¾	8.255	2¾	7.303	1¾	3.493	do.....	216D	351849
e.....	2½	6.350	3¾	8.573	1¾	4.128	do.....	216C	351849
f.....	4¾	10.478	2¾	7.303	2¾	5.398	do.....	216B	351849
54, a.....	5½	13.970	3¾	9.525	1¾	3.969	do.....	218	351851
b.....	5¾	14.129	5¾	13.176	1¼	3.175	House A, room 22.....	135A	351784
c.....	9¾	23.654	5¾	13.653	1¾	4.445	House A, room 27.....	217	351850
d.....	10¾	26.353	4¾	12.383	1¾	3.334	House B, room 4.....	336	351960

TABLE 3.—SIZE AND PROVENIENCE OF OBJECTS ILLUSTRATED IN PLATES—Continued

Plate	Length		Diameter		Provenience	Field No.	National Museum No.
	Inches	Centi-meters	Inches	Centi-meters			
55, a-----	1¾	4.445	1¾	3.175	A refuse-----	102B	351756
b-----	1¾	4.763	1½ ¹⁶	3.334	Burial B-2-----	298A	351920
c-----	1¾	4.445	3	7.620	House A, room 34-----	202	351838

Plate	Width		Breadth		Height		Provenience	Field No.	National Museum No.
	Inches	Centi-meters	Inches	Centi-meters	Inches	Centi-meters			
55, d-----	7¾	19.685	6½	16.510	8½ ¹⁶	22.066	Kiva A-----	265	351898
e-----	7½ ¹⁶	19.526	6¾	16.828	8¾	21.908	do-----	266	351899

Plate	Length		Width		Thickness		Provenience	Field No.	National Museum No.
	Inches	Centi-meters	Inches	Centi-meters	Inches	Centi-meters			
58, a-----	12¾	31.115	3¾	8.255	1¾	4.128	B refuse-----	321A	351943
b-----	12¾	31.115	2½	6.350	1¾	4.445	Burial 2-----	10	351662
c-----	7¾	18.098	5¾	13.335	1¾	3.493	House A, room 33-----	163	351807
d-----	4¾	10.795	3¾	8.255	3¾	9.208	Kiva A, room-----	264	351897
e-----	5¾ ¹⁶	13.176	-----	-----	¾ ¹⁶	1.111	do-----	241	351873
f-----	6¾ ¹⁶	16.034	5¾	14.288	1½ ¹⁶	4.921	do-----	241A	351874

Plate	Length		Width		Provenience	Field No.	National Museum No.
	Inches	Centi-meters	Inches	Centi-meters			
57, a-----	1½	3.810	1½ ¹⁶	2.699	Kiva B-----	250C	351882
b-----	1¾	3.493	1½ ¹⁶	2.699	House A, room 27-----	210B	351844
c-----	1½	3.810	¾	1.905	Kiva B-----	250F	351882
d-----	1½	3.810	1½ ¹⁶	2.699	A refuse-----	102H	351756
e-----	1¾	3.493	¾	2.223	House A, room 27-----	210A	351844
f-----	1¾ ¹⁶	3.016	1½ ¹⁶	1.746	Burial 31-----	71B	-----
g-----	1¾ ¹⁶	3.969	1¾	3.493	Surface B-----	329C	351953
h-----	1¾	4.445	1½	2.858	House A, room 49-----	178	-----

Plate	Length		Greatest width		Provenience	Field No.	National Museum No.
	Inches	Centi-meters	Inches	Centi-meters			
58, a-----	2¾	6.668	1¾ ¹⁶	3.016	House A, room 34-----	198	351834
b-----	3¾	8.573	1¾ ¹⁶	3.016	House A, room 41-----	165	351809
c-----	3½ ¹⁶	9.366	1¾	4.763	House A, room 34-----	197	351834
59, a-----	1½ ¹⁶	3.338	½	1.270	House A, room 18-----	229	351861
b-----	1¾	3.175	¾ ¹⁶	1.429	Burial 2-----	4	351656
c-----	1¾ ¹⁶	3.016	¾ ¹⁶	1.429	House A, room 34-----	200A	351835
d-----	1½ ¹⁶	2.699	½	1.270	do-----	200C	351835
e-----	1	2.540	½	1.270	do-----	200B	351835
f-----	2	5.080	1½	2.858	Great kiva 1-----	259A	351892
g-----	1¾ ¹⁶	4.604	1½ ¹⁶	1.746	B refuse-----	370	351989
h-----	1¾	4.128	¾	1.905	Great kiva 1-----	259C	351892

TABLE 3.—SIZE AND PROVENIENCE OF OBJECTS ILLUSTRATED IN PLATES—Continued

Plate	Length		Width		Provenience	Field No.	National Museum No.
	Inches	Centi-meters	Inches	Centi-meters			
59, <i>f</i>	$\frac{5}{8}$	1.588	$\frac{7}{16}$	1.111	House B, room 13.....	350B	351971
<i>k</i>	$1\frac{1}{2}$ ₂	1.191	$\frac{3}{8}$	.953	Great kiva 1.....	258B	351891
<i>l</i>	$\frac{1}{4}$	.635	$\frac{5}{16}$	.794	Kiva A.....	245A	-----
<i>m</i>	$1\frac{1}{4}$ ₆	1.746	$1\frac{1}{16}$	1.746	House A, room 14.....	225	351858
<i>n</i>	1	2.540	$1\frac{3}{16}$	3.016	B refuse.....	321B	351944
<i>o</i>	$1\frac{1}{4}$ ₆	1.746	$\frac{9}{16}$	1.429	House A, room 31.....	145	351793

Plate	Length		Width		Top to bottom		Provenience	Field No.	National Museum No.
	Inches	Centi-meters	Inches	Centi-meters	Inches	Centi-meters			
60, <i>a</i>	$5\frac{3}{8}$	13.653	3	7.620	-----	-----	House B, room 4.....	339	351963
<i>b</i>	$6\frac{3}{8}$	16.193	$3\frac{3}{8}$	8.573	$7\frac{3}{4}$	19.685	Kiva A.....	240	351872

TABLE 4.—SIZE AND PROVENIENCE OF OBJECTS ILLUSTRATED IN TEXT FIGURES

Figure	Diameter		Height		Provenience	Field No.	National Museum No.
	Inches	Centi-meters	Inches	Centi-meters			
19, <i>a</i>	$13\frac{3}{8}$	35.243	$11\frac{3}{4}$	29.845	House B, room 13.....	377	351996
20, <i>a</i>	$13\frac{1}{4}$	33.655	$10\frac{1}{2}$	26.670	House A, room 34.....	271	351900
21, <i>a</i>	$6\frac{1}{2}$	15.558	$5\frac{3}{4}$	14.605	Burial 8.....	32	351682
<i>b</i>	$6\frac{3}{16}$	15.716	$3\frac{1}{2}$	8.890	Burial 24.....	57	351708
22, <i>a</i>	$5\frac{1}{2}$	13.018	$2\frac{3}{16}$	5.556	Below room 31, H. A.....	149	351796
23, <i>a</i>	$5\frac{5}{8}$	14.288	$5\frac{3}{4}$	14.605	Burial 31.....	70	351721
<i>b</i>	$6\frac{3}{4}$	17.145	$6\frac{3}{8}$	16.193	Burial 26.....	63	351714
24, <i>a</i>	$3\frac{1}{2}$	8.890	$3\frac{3}{4}$	9.525	Below room 10, H. A.....	151	351800
25, <i>a</i>	$7\frac{1}{4}$ ₆	19.209	$3\frac{7}{16}$	8.731	Burial 21.....	52	351703
<i>b</i>	$7\frac{3}{4}$	19.685	$3\frac{1}{2}$	8.890	Burial 20.....	51	351702
26, <i>a</i>	$7\frac{7}{16}$	18.891	3	7.620	Burial 15.....	44	351695
<i>b</i>	$7\frac{5}{8}$	19.368	$3\frac{1}{2}$	8.890	Burial 8.....	33	351683
27, <i>a</i>	$7\frac{3}{16}$	18.256	$3\frac{1}{2}$	8.890	Burial 28.....	66	351717
<i>b</i>	$7\frac{3}{4}$	19.685	$3\frac{3}{4}$	9.525	House B, room 17.....	363	351982
28, <i>a</i>	$8\frac{1}{2}$	21.590	$3\frac{1}{2}$	8.890	House A, room 27.....	208	351842
<i>b</i>	$8\frac{3}{8}$	21.273	$3\frac{3}{4}$	9.525	Burial B-2.....	298	351919
29, <i>a</i>	$8\frac{3}{8}$	21.273	$3\frac{5}{8}$	9.208	House A, room 14.....	222	351855
<i>b</i>	8	20.320	$3\frac{5}{8}$	9.208	Burial 40.....	89	351741
30, <i>a</i>	$9\frac{5}{8}$	24.448	$4\frac{1}{4}$	10.795	Burial 2.....	8	351660
<i>b</i>	$8\frac{5}{8}$	21.908	$4\frac{1}{4}$	10.795	Burial 5.....	17	351669
32, <i>a</i>	$4\frac{3}{8}$	12.383	$2\frac{1}{2}$	6.350	B refuse.....	378	351997
<i>b</i>	$4\frac{3}{16}$	10.954			House B, room 17.....	379	351998

Figure	Length		Width		Height		Provenience	Field No.	National Museum No.
	Inches	Centi-meters	Inches	Centi-meters	Inches	Centi-meters			
34, <i>a</i>	5	12.700	$2\frac{1}{2}$	6.350	$3\frac{3}{8}$	9.208	House B, room 7.....	341	351965
<i>b</i>	$3\frac{3}{8}$	8.573	2	5.080	$2\frac{5}{8}$	6.668	House A, room 23.....	219	351852

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